Five-Year Review Report

First Five-Year Review Report
for the Vandale Junkyard Superfund Site
Washington County, Ohio

April 2004

PREPARED BY:

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Region 5
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Approved by:

Richard C Karl

Richard C. Karl, Acting Director
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Date:

4-15-04

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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
DCE	Dichloroethylene
EMI	Engineering Management, Incorporated (the PRP Project Coordinator)
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
HDPE	High Density Polyethylene
IMMP	Inspection, Maintenance, and Monitoring Plan
IOC	Inorganic Compound
LPL	Lower prediction limit
LURA	Land Use Restriction Agreement
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NPL	National Priorities List
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
O&M	Operation and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
PCE	Tetrachloroethylene

List of Acronyms, cont.

PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVOC	Semi-volatile Organic Compound
TBC	To Be Considered
TCA	1,1,1-trichloroethane
TCE	Trichloroethylene
UAO	Unilateral Administrative Order
UCL	Upper confidence limit
UPL	Upper prediction limit
USACE	United States Army Corps of Engineers
VOC	Volatile Organic Compound

Executive Summary

The remedy for the Vandale Junkyard Superfund Site in Washington County, Ohio includes off-site disposal of hazardous wastes; consolidation of soils and solid wastes exceeding soil cleanup levels under a hazardous waste cap; institutional controls; monitored natural attenuation of groundwater, sediments, and surface water; and other operation and maintenance (O&M) requirements such as cap mowing, inspection, and repair. The Site achieved construction completion with the signing of the Preliminary Close Out Report (PCOR) on July 7, 2000. The trigger for this Five-Year Review is the actual start of construction on April 22, 1999.

The assessment of this Five-Year Review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). The constructed waste cap portion of the remedy is functioning as designed. The immediate threats at the Site have been addressed, and the remedy is expected to be protective when groundwater, sediment, and surface water cleanup goals are achieved through monitored natural attenuation. However, the groundwater portion of the remedy (monitored natural attenuation) has not demonstrated expeditious progress toward meeting cleanup goals as shown by statistical trend analysis of groundwater data.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Vandale Junkyard Superfund Site		
EPA ID *(from WasteLAN)*: OHD980794606		
Region: 5	**State:** OH	**City/County:** Washington County

SITE STATUS	
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)	
Remediation status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete	
Multiple Operable Units (OU)? ☐ YES ☒ NO	**Construction completion date:** July 7, 2000
Has site been put into reuse? ☐ YES ☒ NO	

REVIEW STATUS	
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author name: Ronald W. Murawski	
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA, Region 5
Review period: September 2003 to March 2004	
Date of site inspection: November 13, 2003	
Type of review: ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion)	
Review number: ☒ 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA On-site Construction at OU #___ ☐ Construction Completion ☐ Other (specify)	☒ Actual RA Start at OU# NA ☐ Previous Five-Year Review Report
Triggering action date *(from WasteLAN)*: April 22, 1999	
Due date *(five years after triggering action date)*: April 22, 2004	

Five-Year Review Summary Form, cont'd.

Issues:

Evidence of small animal burrows at a few locations on the cap

Land Use Restriction Agreement (LURA) to Create an Equitable Servitude not agreed upon by the land owner and not filed with the Washington County Recorder's Office

Erosion causing sedimentation into Tributary A

Site owner, on occasion, interferes with O&M activities

Mobile home trailer located within O&M area

Flowmeter used to measure the amount of water coming from under the capped area is not functional

Access roads are eroding

Drainage pipes are occasionally clogged, preventing water drainage from the Site

Collar of well MW03-12 is cracked

Expeditious progress toward meeting cleanup goals not shown

Groundwater contingency evaluation has been triggered based on criteria listed in the April 2001 "Inspection, Maintenance, and Monitoring Plan" (IMMP)

Recommendations and Follow-up Actions:

Repair current burrows and ensure future burrows are identified and repaired

Obtain a signed LURA from the Site owner and record the document in the Washington County Recorder's Office

Continue to implement controls such as rock placement, revegetation, and diversion measures to minimize erosion into Tributary A

Continue to work with PRPs and Site owner; enforce against Site owner as necessary to prevent owner interfering with O&M activities

Relocate mobile home trailer from O&M area (to SW corner of Site, for example)

Repair and activate flowmeter used to measure water originating from the buttress wall drains

Control erosion by adding rock, etc. to access roads

Repair crack or replace collar of well MW03-12

Periodically inspect and unclog drainage pipes

Continue collection and analysis of samples to determine full protectiveness of the remedy

Conduct a groundwater contingency evaluation to help determine full protectiveness of the remedy

Protectiveness Statement:

All immediate threats at the Site have been addressed, and the remedy is expected to be protective of human health and the environment after groundwater, surface water, and sediment cleanup goals are achieved.

Long-term Protectiveness:

Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater, surface water, and sediment samples to fully evaluate potential migration of any contaminant plume downgradient from the capped area. Current monitoring data indicates that only a minimal number of groundwater wells is showing statistically significant decreasing trends. This suggests that monitored natural attenuation is not occurring at an expeditious rate to meet cleanup goals. Additional data collection is warranted to determine whether the remedy may be functioning as required to achieve groundwater, surface water, and sediment cleanup goals.

Other Comments:

None.

VANDALE JUNKYARD SUPERFUND SITE
WASHINGTON COUNTY, OHIO
FIVE-YEAR REVIEW REPORT

I. INTRODUCTION

The purpose of the Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and identify recommendations to address them.

The United States Environmental Protection Agency (EPA) is preparing this Five-Year Review Report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

EPA interpreted this requirement further in the NCP. 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA Region 5 conducted the Five-Year Review of the remedy implemented at the Vandale Junkyard Superfund Site in Washington County, Ohio. This review was conducted for the entire Site from September 2003 through March 2004 by a regulatory team headed by EPA and included Ohio EPA and the United States Army Corps of Engineers (USACE). This report documents the results of the review.

This is the first Five-Year Review for the Vandale Junkyard Superfund Site. The triggering action for this statutory review is the initiation of the remedial action on April 22, 1999. This Five-Year Review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

II. SITE CHRONOLOGY

Table 1: Chronology of Site Events

EVENT	*DATE*
Junkyard operation receives wastes	1945-1980 (est.)
EPA proposes Site for National Priorities List (NPL)	10/15/1984
Final Listing on EPA NPL	06/10/1986
EPA signs Consent Order for PRPs to perform RI/FS	07/24/1987
PRPs begin RI	09/1988
EPA takes over responsibility of the RI from the PRPs	08/17/1990
EPA completes RI Report	02/18/1992
Public comment period to comment on EPA's Proposed Plan for the preferred remedy	08/27/-11/13/1992
EPA presentation to the public of the Proposed Plan	09/10/1992
ROD selecting the remedy is signed	03/31/1994
Unilateral Administrative Order (UAO) issued to PRPs to design and implement the remedy, and reimburse EPA for all response costs incurred by the United States	08/16/1994
Second UAO issued to additional PRPs	10/31/1995
PRP Remedial Design approved by EPA	01/31/1997
Start of on-site construction to implement the remedy	04/02/1997
PRP Modified Remedial Design approved by EPA	02/09/1999
Re-start of on-site construction to implement the remedy (date that triggers a five-year review)	04/22/1999
Pre-final inspection of the remedial construction completed	06/09/2000
Preliminary Close Out Report signed	07/07/2000
Final inspection of the remedial construction completed	07/17/2000
Inspection, Maintenance, and Monitoring Plan approved by EPA (conditional on a Land Use Restriction Agreement being signed and recorded)	04/13/2001
EPA approves PRP work plan to install additional groundwater monitoring wells	01/31/2003
PRPs issue report of completing new monitoring well installation	08/04/2003

III. BACKGROUND

Physical Characteristics

The Vandale Junkyard Site (the Site) is located in a rural area approximately 1.5 miles northeast of Marietta, Ohio, on an unpaved access road off of Marietta Township Road 83 in Washington County. See Figure 1. Marietta is located north of and adjacent to the Ohio River. The Site is located in the rolling hills of the Appalachian Plateau Province in southeastern Ohio. Duck Creek, a small tributary to the Ohio River, is located less than one-quarter of a mile west of the Site. Surface water drainage from the Site flows through two intermittent streams to Duck Creek.

The Site encompasses approximately 31 acres, approximately 10 acres of which were used as a junkyard at the top of the ridge of the Site. The ridge is bordered on the north and east by steep, wooded ravines with depths approaching 200 feet. The remainder of the Site consists of portions of steeply sloped ravines. The Marietta Sanitation Corporation Landfill, now closed, borders the Site on the south.

Land and Resource Use

The Site contains several barns and an occupied, residential trailer, as well as various junkyard materials. Agriculture and residential dwellings are the primary land uses in the area. Approximately 200 residences are located within one mile of the Site. Although a public water supply system is available in the area, some residents use private wells as drinking water sources. There is no known use of Site groundwater.

The capped area of the Site, approximately four acres on the northeast end, is surrounded by a six-foot fence with barbed wire and locking gates. Twelve groundwater monitoring wells exist in and around the capped area. See Figure 2. The current owner of the Site uses areas outside of the capped area for cattle grazing.

Due mostly to the steeply sloped topography, the Site is not a likely candidate for redevelopment.

History of Contamination

The Vandale Junkyard has been a county-licensed junkyard operation since the early 1960s and may have been operating since the 1940s. During its operation, it received a variety of materials for disposal and/or salvage. These materials included typical household and commercial waste, such as scrap metal, white goods, tires, batteries, automobiles, and non-putrescible municipal waste.

The junkyard also accepted several thousand 55-gallon drums containing variable quantities of industrial waste solvents and degreasers, waste tar and iron cakes, sludges from organic chemical

manufacturing, paint thinners, paints, and ink wastes from local and distant industrial firms. The owner reportedly dumped any materials from the drums onto the ground. The owner then reportedly burned the liquids. The owner also reportedly burned any materials inside the drums that could not be poured onto the ground.

The Remedial Investigation (RI) Report demonstrated the existence of widespread organic and inorganic contamination in Site soils, groundwater, surface water, and sediments. The main risk to human health identified in the RI Report is through ingestion of Site groundwater. The contaminants which contribute most to excess risks and hazards in groundwater include antimony, arsenic, barium, bis(2-ethylhexyl) phthalate, cadmium, 1,1-dichloroethene, nickel, tetrachloroethene, vanadium, and vinyl chloride.

Initial Response

Although investigations of hazardous waste disposal at the Site began in 1980 when Ohio Environmental Protection Agency (Ohio EPA) personnel first visited the Site, the Site had a history of complaints to local authorities from nearby residents dating back to at least 1969. Most of the complaints appear to have been related to open-burning and accepting wastes which created nuisances such as odors and rodents. Based on observations of drummed waste at the Site in 1980, EPA and Ohio EPA conducted preliminary assessments of contamination from 1980 to 1983 under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

The State of Ohio filed suit against the owner/operator of the Site in 1984, and the two parties reached a settlement which assured access to the Site for investigations and prohibited filling, grading, excavation, and burning activities, and any further collection of solid or hazardous waste. Washington County allowed the owner/operator to continue junkyard operations. Since 1984, concern from nearby residents has greatly decreased.

Based on the assessments of the release of hazardous substances, EPA proposed the Site for inclusion on the National Priorities List (NPL) on October 15, 1984. Final listing on the NPL occurred on June 10, 1986. On July 24, 1987, EPA and Ohio EPA entered into an Administrative Order on Consent with the PRPs for the PRPs to perform the RI/FS.

On August 17, 1990, EPA terminated the authority of the PRPs to conduct the RI/FS, after a dispute about the work conducted by the PRPs. EPA assumed responsibility for completion of the RI and the FS, with the cooperation of Ohio EPA.

EPA issued the final RI Report on February 18, 1992 and issued the final Feasibility Study (FS) Report on August 12, 1992. On September 10, 1992, EPA presented the Proposed Plan, including EPA's preferred remedy, to the public. The public comment period lasted from August 27 through November 13, 1992.

Basis for Taking Action

The RI Report and Record of Decision (ROD) documented releases from hazardous wastes at the Site to groundwater, surface water, sediments, and soil. The reports documented volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), and inorganic compounds (IOC) in each of the four media.

The Baseline Risk Assessment portion of the RI Report concluded that the contaminants which contributed most to elevated Site risks for human health include: the VOCs 1,1-dichloroethene, tetrachloroethene, and vinyl chloride; the SVOCs bis(2-ethylhexyl)phthalate and polycyclic aromatic hydrocarbons (PAHs); and the IOCs antimony, arsenic, barium, cadmium, and lead.

The risk assessment also concluded that approximately 95 percent of the excess risk to human health associated with the Site is due to potential use of groundwater, with the remaining 5 percent associated with dermal contact with Site soils. The contaminants which contribute most to excess risks and hazards in groundwater include antimony, arsenic, barium, bis(2-ethylhexyl) phthalate, cadmium, 1,1-dichloroethene, nickel, tetrachloroethene, vanadium, and vinyl chloride. The contaminants which contribute most to excess risks and hazards in soils include antimony, arsenic, bis(2-ethylhexyl)phthalate, lead, and PAHs.

IV. REMEDIAL ACTIONS

Remedy Selection

The ROD for the Site was signed on March 31, 1994. The ROD identified the following Remedial Action Objectives (RAO) for the Site. These RAOs were developed as a result of data collected during the RI to aid in the development and screening of remedial alternatives:

I. Achieve a total Site risk of 10^{-6} or less for carcinogens,

II. Achieve a total Site hazard index of 1 or less for noncarcinogens, and

III. Meet all applicable or relevant and appropriate requirements (ARAR).

The selected remedy in the ROD includes the following components:

1. Collection and consolidation of materials estimated at 9,000 cubic yards of soils (including drummed wastes) containing organic and inorganic contaminants;

2. Segregation of solid wastes, including drummed wastes, from soils;

3. Off-site disposal of drummed materials, sludges, and other wastes which contain substances, especially hazardous wastes, not suitable for on-site containment;

4. Screening of solid waste materials for salvageable materials to be decontaminated on-site and taken off-site for salvage;

5. Consolidation in areas on-site of soils and non-salvageable solid wastes which exceed soil cleanup levels, followed by the construction of a RCRA Subtitle C hazardous waste cap;

6. In-place bioremediation of sediments as necessary in the seeps on the north slope which exceed cleanup levels for organic contaminants;

7. Institutional controls necessary to ensure the integrity of the remedial action, including deed restrictions and fencing to restrict Site access to prevent the installation of drinking water wells and the disturbance of the capped area while cleanup levels are being achieved;

8. Groundwater and surface water/sediments monitoring program to confirm that the removal, treatment, and containment of source materials and the natural attenuation of residual contaminants allow for the expeditious attainment of cleanup levels; and

9. Other operation and maintenance (O&M) requirements, including cap mowing, inspection, and repair.

The selected remedy protects human health and the environment by removing, treating, or containing all significant threats at the Site, thereby reducing human health and environmental risks to acceptable levels.

Remedy Implementation

On August 16, 1994, EPA issued a Unilateral Administrative Order to the PRPs, including the Site owner, to perform the Remedial Design and Remedial Action (RD/RA) to design and implement the remedy, and to reimburse EPA for all response costs incurred by the United States. On October 31, 1995, EPA issued a similar UAO to additional PRPs.

In September of 1994, the PRP contractors began the RD. Between 1994 and 1996, the PRP contractors implemented source control measures at the Site as required in the ROD, including relocation, consolidation, and off-site disposal of scrap metal, non-metallic debris, tires, drums and drum fragments, and impacted soil. In January of 1997, EPA approved the Final Design Report. In April of 1997, the PRP contractors began the RA construction at the Site. In July of 1997, USACE, which is the RA oversight grantee for EPA, and PRP contractors reported that geological shifting was occurring in and around the area to be capped. Shortly after, EPA and the PRPs agreed that the remedy could not be implemented as stated in the ROD, due to the geological shifting. Therefore, the PRP contractors ceased construction activities.

For the remainder of 1997 and the first half of 1998, the PRP contractors conducted and reported on additional Site investigations relating to conceptual Site modeling of physical and environmental conditions. In September of 1998, EPA approved the PRPs' Conceptual Site Model Physical Conditions Report and the Conceptual Site Model Environmental Conditions Report.

For most of 1998, the PRP contractors worked on the Modified RD for the Site. The Modified Final Design Report, approved by EPA in February of 1999, contains design features to stabilize the area to be capped, most notably an earthen buttress which was later constructed at the toe of the cap. EPA considered design modifications associated with the Modified Final Design Report to be nonsignificant.

During the Pre-Remedial Design phase and at the beginning of the construction of the modified remedy, the PRP contractors sampled sediment and water samples from the seeps on the north slope. EPA reviewed subsequent analytical results and a risk assessment from the PRP contractors, and agreed that bioremediation of the seeps was not necessary.

In April of 1999, the PRP contractors mobilized on-site to restart construction to implement the modified design. On July 7, 2000, EPA issued the Preliminary Close-Out Report, indicating the completion of RA construction activities. The following text documents the main components of the "enhanced remedy" of the Modified Final Design Report that the PRPs have implemented.

1. Construction of a slope buttress near the toe of the northeast slope of the area to be capped;

2. Installation of a subsurface drainage system, including installation of a geotextile filter, high density, polyethylene (HDPE) piping, drainage gravel, and two concrete collection sumps;

3. Excavation and consolidation of impacted material to designated areas up slope of the buttress;

4. Construction of a final cap system over the consolidated, impacted material, including:

    - Placement, grading, and compaction of impacted material under the cap
    - Placement of 12 inches of bedding soil
    - Placement of a 60-mil, HDPE geomembrane liner
    - Placement of a geocomposite drainage layer
    - Placement of 18 inches of cover soil

- Placement of 6 inches of topsoil
- Establishment of a full, vegetative, grass cover;

5. Installation of surface water management structures to manage run-on and run-off on and around the final remedy containment structure, including installation of perimeter drainage ditches, intermediate cover benches, and a buttress wall diversion ditch;

6. Implementation of erosion and sedimentation controls:

   In areas north, south, east, and west of the cap, the PRP contractors performed grading, seeding, mulching, and silt fencing. Vegetation has already been fully established in these areas, except for an area northwest of the cap; therefore, the silt fencing, which was a temporary measure until vegetation was established, has been removed;

7. Regrading and revegetation of disturbed areas of the slope:

   The PRP contractors periodically perform these functions as part of the O&M activities, as necessary.

Operation and Maintenance (O&M)

The EPA-conditionally approved, April 2001 IMMP will receive full approval when the PRPs produce a signed, recorded Land Use Restriction Agreement (LURA).

The IMMP requirements include a groundwater, surface water, sediments, and sump monitoring program, periodic inspection and maintenance of the cap and surrounding areas, and a groundwater contingency evaluation if the groundwater component of the remedy fails to demonstrate expeditious progress toward meeting cleanup goals. The IMMP requirements also include a monitored natural attenuation (MNA) efficacy evaluation report that contains an evaluation of the effectiveness of MNA processes, including a discussion of "expeditious progress" toward meeting cleanup goals. The PRPs conduct the periodic (now, quarterly) inspections of the cap and surrounding areas. Ohio EPA and USACE assist EPA to perform oversight of the PRPs' O&M activities.

Prior to issuance of this Five-Year Review Report, the PRP contractors completed 11 quarterly sampling events, beginning in June, 2001. This Five-Year Review Report covers sampling results from nine of the events. Due to the lag time between sampling and report generation, this Five-Year Review Report does not cover the December, 2003 or March, 2004 sampling events. Due to concerns that EPA had with how the PRP contractors were developing replacement groundwater monitoring wells, the December, 2001 sampling event did not occur.

From April through June 2001, the PRP contractors installed the initial groundwater monitoring well network. The PRP contractors installed replacement groundwater monitoring wells in May and June of 2003, either because the existing wells were dry or low yielding, or because EPA did not believe that enough boundary wells existed to define any groundwater contaminant plume.

EPA continues to work with the PRPs, including the Site owner, to obtain a signed, recorded document entitled, "Land Use Restriction Agreement to Create an Equitable Servitude." This document describes the land use restrictions needed to ensure the remedy continues to protect human health and the environment. The main reason for this document not being finalized is the owner's unwillingness to sign the document, due to his belief that the document contains excessive restrictions.

The latest draft version of the LURA prohibits placement of a permanent or mobile residential home on the property where the location of the home is on or near the capped area, or where the location could interfere with O&M activities. The Site owner placed a mobile home trailer immediately west of the cap that EPA believes could interfere with O&M activities. EPA is working with the Site owner and his attorney to have the trailer moved away from O&M operations.

EPA continues to be concerned about the erosion and sedimentation from the area northwest of the cap into the nearby tributary ("Tributary A"). Since construction completion, the PRPs attempted to reduce the erosion and sedimentation, with little success. Obstacles to implementing successful erosion and sedimentation control include a steeply sloped landscape toward the tributary and the Site owner's interference with (including grazing his cattle on the slope) and resistance to the PRPs' proposed activities. EPA and Ohio EPA continue to work with the PRPs to ensure that the PRPs implement effective erosion and sedimentation controls.

V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first Five-Year Review for the Site.

VI. FIVE-YEAR REVIEW PROCESS

Administrative Components

The EPA Remedial Project Manager (RPM), Ron Murawski, notified Ohio EPA, USACE, and the PRP Project Coordinator (Engineering Management, Incorporated (EMI)) of the initiation of the five-year review process in the summer of 2003. Ron Murawski headed the five-year review team, and Dr. Luanne Vanderpool, an EPA hydrogeologist, assisted him. The team also included Ohio EPA (whose primary contact for the review is Site Coordinator Michael D. Sherron) and USACE (whose primary contact for the review is Project Manager Lisa A. Humphreys).

The review schedule included the following components:

- Community Notification;
- Document Review;
- Data Review;
- Site Inspection;
- Interviews; and
- Five-Year Review Report Development and Review.

Community Notification

Beginning in August 2003, the RPM discussed with the EPA Community Involvement Coordinator (CIC), Zenny Sadlon, the need to notify the community that the five-year review process was underway. In November 2003, the EPA Office of Public Affairs placed an ad in the Marietta Times announcing that the Five-Year Review was in progress and requesting that any interested parties contact EPA for more information.

Since the ad was issued, no member of the community voiced an interest in the Five-Year Review.

Document Review

This Five-Year Review consisted of a review of relevant documents including O&M quarterly monitoring reports and monitoring data, the ROD, the MNA Efficacy Evaluation Report, and related records and reports (see Table 2). The regulatory team also reviewed applicable cleanup standards as listed in the 1994 ROD.

Data Review

See Figure 2 for locations of the groundwater, surface water, and sediment monitoring points.

Groundwater Monitoring

The PRP contractors have conducted quarterly groundwater sampling at the Site since June 2001. The most consistently observed constituents that exceed the ROD-based groundwater cleanup criteria are chlorinated VOCs (1,1,1-trichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, tetrachloroethene, and vinyl chloride). There have been occasional detections of the semi-volatile compound bis(2-ethylhexyl)phthalate and several metals, including antimony, barium, and vanadium, that have exceeded the ROD-based groundwater cleanup criteria; however, none of these elevated detections have been measured consistently at any of the monitoring wells.

Elevated levels of the chlorinated VOCs have been detected consistently at wells MW01-02, MW01-07, MW01-08, and MW01-10. An EPA contractor, Volpe National Transportation

Systems Center (Volpe) performed statistical analyses of the groundwater data from these four monitoring wells. Elevated levels of chlorinated VOCs have also been detected in the two most recent sampling events (July 2003 and September 2003) at the newly installed monitoring wells MW03-6, MW03-9, and MW03-11. Since at least four samples from a well are required to run the statistical tests, Volpe did not statistically analyze the data from these wells.

Volpe ran three different statistical tests on the data from MW01-02, MW01-07, M01-08, and MW01-10. Each procedure was run for each contaminant of concern at each of the four wells. All tests were run at a 95 percent confidence level.

- Comparison to Standard: the upper 95 percent confidence limit for the mean of the contaminant concentration of the four most recent samples was compared to the cleanup standard to determine if a statistically significant exceedance has occurred.

- Comparison to Baseline: The upper prediction limit (UPL) and lower prediction limit (LPL) of the contaminant level for the sampling events between June 2001 and September 2002 ('the baseline period") were calculated for each contaminant. The most recent sampling result (September 2003) was compared to the prediction limits to determine if the sampling results were significantly better or worse than during the baseline period.

- Trend Analysis: Sen's test for trend used all data points for each contaminant at each well location and tested for an increasing or decreasing trend through time.

Table 3, taken from the Volpe Statistical Analysis Report, summarizes the results of the statistically significant findings for the groundwater contaminants of concern (COC) of the ROD. The text immediately after Table 3 further explains the results in the table. Figures 3 to 21 are graphs of the "Exceed Standard" column of Table 3, Figures 22 to 24 are graphs of the "Natural Attenuation" column, and Figures 25 to 28 are graphs of the "Trend" column.

Since the start of groundwater monitoring in 2001, 6 of the 13 contaminants for which groundwater cleanup levels have been established have remained below their respective cleanup goals in all sampling events for the four wells in question. In the Comparison to Standards tests, the upper confidence limits (UCL) of the following seven constituents exceeded their cleanup standards in at least one well location:

- antimony
- barium
- bis(2-ethylhexyl)phthalate
- 1,1-dichloroethene
- cis-1,2-dichloroethene
- tetrachloroethene
- vinyl chloride

The detection levels for bis(2-ethylhexyl)phthalate were greater than the cleanup standard of 1.0 µg/l. As a result, even though bis(2-ethylhexyl)phthalate was not detected at MW01-07, MW01-08 and MW01-10, it was identified as above the cleanup standard by the Comparison to Standard test. The UCLs for antimony and barium concentrations at MW01-10 and MW01-08, respectively, were slightly above the cleanup standards. Antimony has a history of non-detects with only the most recent sample being a detect value. The UCL above the cleanup level for barium appears to be due to a spike in the concentration during the January 2003 sampling event. Data previous to and subsequent to the January 2003 event has shown concentrations of barium below the cleanup levels.

At all four wells, at least one standard for a VOC was exceeded based on the Comparison to Standard test. However, in no case did the most recent sample exceed the baseline in the Comparison to Baseline testing. At MW01-07 for several constituents, the most recent sample was below the baseline LPL. In all other analyses, there was no significant difference between the September 2003 level of contamination and the baseline period.

Overall, the quarterly monitoring appears to indicate steady-state conditions with regard to VOC levels in the groundwater over the recent past. At MW01-08, there is a statistically significant increasing trend for 1,1 DCE. This is the only statistically significant increasing trend identified by the trend analysis. In most cases, there is no clearly apparent increase or decrease in VOC concentrations since the quarterly monitoring began in 2001.

The progress of the natural attenuation processes at the Site was evaluated using four of the monitoring objectives identified in the *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites* (OSWER Directive No. 9200.4-17P, April 21, 1999) for evaluating the performance of an MNA remedy. These objectives are:

- Demonstrate that natural attenuation is occurring according to expectations;
- Detect changes in environmental conditions that may reduce the efficacy of the natural attenuation processes;
- Identify any potentially toxic or mobile transformation products; and
- Verify that the plume is not expanding either downgradient, laterally, or vertically.

Qualitatively, one sees VOC concentrations diminish with distance away from the source area, and one sees evidence of degradation products as the contaminated groundwater moves downgradient from the capped area (see Figure 2) as is documented in the PRP contractor's MNA Efficacy Evaluation Report. The ROD requires that natural attenuation proceeds expeditiously toward meeting the groundwater cleanup goals. To provide a positive declaration that natural attenuation is making expeditious progress, one would like to see statistically significant decreasing trends through time for every constituent at every sampling location. The record is insufficient to demonstrate such trends at this time. Currently, there is not a statistically significant decreasing trend through time for every constituent at every sampling location. Only three statistically significant decreasing trends were identified by Volpe (Table 3) and one

increasing trend was identified. The statistical analysis does not demonstrate that natural attenuation is occurring expeditiously at the Site. Statistical analysis of additional monitoring data should identify significant trends among more wells and contaminants, and should help to determine whether expeditious progress toward cleanup goals is being achieved.

The contaminant that had an increasing trend was 1,1,-dichloroethene; this was at only one location, MW01-08. The most recent sample of 1,1,-dichloroethene at MW01-08 statistically exceeded previous sampling concentrations as well. These observations may indicate that contamination is becoming worse at this location. However, the presence of 1,1 DCE is most likely due to the degradation of 1,1,1-TCA, and the increase in a daughter product (1,1, DCE) may not indicate that natural attenuation is not functioning according to expectations.

As part of the quarterly sampling and analysis requirements, the PRP contractor measured and analyzed a suite of MNA indicator parameters, including nitrogen, total organic carbon, ethane, ethene, nitrate, and nitrite. These analyses indicate that environmental conditions remain favorable to natural attenuation processes on the Site and that chlorinated contaminants of concern are being destroyed by naturally occurring, biodegradation processes.

Biodegradation processes may result in the formation of new chemicals that are more toxic or more mobile that their "parent" compounds. The presence of such compounds would raise doubts about the appropriateness of the natural attenuation remedy. Since no potentially toxic or mobile transformation products were identified during sampling events that were not already present at the time of the ROD, the natural attenuation remedy appears to be appropriate.

Regarding plume expansion, downgradient wells MW01-04, MW03-05 and MW-03-12 have concentrations of dissolved VOCs at less than the detection limit and/or below the ROD cleanup levels, suggesting that the plume is not expanding downgradient in the vicinity of these wells. Monitoring well MW03-11 has detectable concentrations of 1,1,1,-TCA, PCE and 1,1-DCE (and exceedances of the cleanup standards for 1,1-DCE and PCE). Only two rounds of sampling data are available from MW03-11 since it was installed during 2003. Monitoring well MW01-07 has detectable concentrations of 1,1,1,-TCA, 1,1-DCE, 1,2-DCE, PCE and vinyl chloride (and exceedances of the cleanup standards for 1,1-DCE, 1,2-DCE, PCE and vinyl chloride). There is some concern that the plume may be expanding in the vicinity of monitoring wells MW03-11 and MW01-07. Additional investigation using a method such as borehole or monitoring well installation may be needed to evaluate plume expansion.

Surface Water, Seep, and Sediment Monitoring

Surface water samples have been collected and analyzed quarterly from five sampling locations (SW01, SW02, SW-03, SW-04, and SW-05) in Tributary A and from one seep (SW-06). See Figure 2. Due to dry conditions, not all scheduled seep and surface water samples were able to be collected.

Quarterly analysis of the surface water and seep samples found that most levels of contaminants of concern were below detection. There was one detection of the semi-volatile compound bis(2-ethylhexyl)phthalate, and there have been occasional detections of lead and silver that have exceeded the ROD-based cleanup criteria in the surface water and seep samples. However, none of these elevated detections have been measured consistently at any of the sample locations, and there were no exceedances during the most recent (September 2003) sampling event.

Sediment samples have been collected and analyzed annually from eight sampling locations in Tributary A. See Figure 2. Five of the sediment sample locations coincide with the location of the surface water samples. All the sediment sampling locations (including SED-01 which is located upstream of the capped area) have consistently shown arsenic and lead at levels that exceed the ROD-based sediment cleanup criteria. No other constituents have been detected above the ROD-based sediment cleanup criteria. The arsenic and lead from the samples located downslope and downstream of the capped area are being detected at levels comparable to those detected at the upstream sediment sampling location (frequently less than and never more than four times than levels measured upstream). Therefore, sediment contamination does not appear to be Site-related; however, more sampling results need to be evaluated before this conclusion can be made with certainty.

Site Inspection

EPA, Ohio EPA, and USACE conducted a Site inspection on November 13, 2003. EMI and representatives of Unisys, B.F. Goodrich, Lockheed Martin, and Kardex (some of the UAO Respondents) accompanied the regulatory team in the inspection. The purpose of the inspection was to assess the protectiveness of the remedy, including the condition of fencing to restrict access, the integrity of the cap, the condition of the monitoring wells and other physical devices associated with the remedy, the effectiveness of erosion and sedimentation controls, and the effectiveness of land use restrictions.

The following statements summarize the main topics covered during the inspection:

- The waste cap was in good physical condition. The grass cover was thick and had been recently mowed. There were some burrows evident, probably from moles. (USACE suggested that these types of burrows could be filled using bentonite pellets.) The nine cap monuments, used to measure movement, were in good condition. The benches and Reno mattresses within the capped area were in good condition.

- The access roads within the capped area, particularly the road immediately east of the cap, are undergoing erosion and need to be periodically reinforced. (Ohio EPA suggested that erosion could be reduced in the eastern access road by adding bigger rock or by otherwise slowing the water flow by crowning the road or adding water bars along the length of the road.)

- The groundwater monitoring wells were generally in good condition. MW03-12, a flush-mounted well, had a crack in the concrete collar that needs to be repaired.

- The flowmeter, used to measure the amount of water flowing from under the capped area, was inoperative. Since construction completion, the flowmeter, when operating, has recorded little water from under the capped area. This indicates that the cap is highly impermeable.

- Due in part to the steep slope of the cap and nearby areas, erosion continues to be a concern, particularly in the areas west and northwest of the cap. This is especially a problem because Tributary A is downslope of the areas in question. Tributary A leads into Duck Creek, which empties into the Ohio River. There were obvious examples in the areas in question where the PRP contractors need to implement erosion controls such as adding rock to slow water flow. EMI contended that the Site owner has prevented the PRP contractors from implementing the controls.

- The PRP contractors installed the gate on the western fence of the capped area. The gate, originally suggested by USACE, helps the samplers to more easily sample groundwater well MW01-10. The easier access improves safety during the inspection and sampling, and reduces the amount of time needed to perform these functions. Gaps under the cap's perimeter fence were mostly eliminated by adding barbed wire under the fence.

- A drainage pipe northwest of the capped area was clogged with hay. (During the inspection, one member of the regulatory team unclogged the pipe with little effort.) Such drainage pipes need to be inspected periodically and unclogged as necessary.

- The Site owner placed a mobile home trailer near the capped area. The location of the trailer can interfere with O&M activities. EPA will continue to work with EMI, the Site owner, and his attorney to have the trailer moved away from O&M activities.

Interviews

The RPM conducted interviews with Michael D. Sherron of Ohio EPA and Steven L. Thompson of USACE. The RPM also requested to interview the City of Marietta employees (through EMI) responsible for conducting the quarterly inspections of the cap and nearby areas, but these employees declined to be interviewed. The RPM discussed the low level of community interest at the Site with the CIC, and the CIC recommended that no face-to-face interviews be conducted. Also, no community members responded to the five-year review ad that invited readers to contact the CIC for more information on the five-year review process.

Mr. Sherron felt that the waste cap was in good physical condition. He felt that the revised groundwater monitoring well network was an improvement over the previous network, in that the revised network is more capable of yielding meaningful data, due to better well locations and

higher yielding wells. Mr. Sherron stated that there were ongoing erosion and sedimentation issues that needed to be continually addressed by the PRPs over time. He also felt that the Site owner, Tom Vandale, needed to cooperate more with the regulatory agencies and with the PRP contractors concerning O&M activities and land use restrictions. He stated that Mr. Vandale's cows were eating the vegetation near the cap, thereby contributing to erosion and sedimentation into Tributary A.

Mr. Thompson had many of the same comments of Mr. Sherron. In addition, Mr. Thompson, as a result of his field oversight activities, stated that the PRP contractors were using proper sampling techniques. He also stated that the PRP contractors needed to periodically fill in low spots in the access roads, including those within the capped area.

Since construction completion, there has been low community interest at this Site. This statement is supported by the minimal contact from the community with EPA in recent years, and by the low turnouts from the community whenever EPA hosted availability sessions. Therefore, the CIC and RPM decided not to conduct interviews of local residents.

VII. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

Review of the documents, ARARS, risk assumptions, monitoring data, and the results of the Site inspection indicates that the remedy is generally functioning as intended by the ROD.

For the RCRA Subtitle C hazardous waste cap, consolidation and containment of the contaminated soils and solid waste has achieved the remedial objectives to minimize the migration of contaminants to groundwater and surface water and prevent direct contact with or ingestion of contaminants in soil and waste.

The ROD requires that natural attenuation proceed expeditiously toward meeting the groundwater cleanup goals. Sampling results analyzed from the Site indicate that natural attenuation processes are occurring. To provide a positive declaration that natural attenuation is making expeditious progress, one would like to see statistically significant decreasing trends through time for every constituent at every sampling location. While there are a few statistically significant decreasing trends through time, the quarterly monitoring data appears to indicate steady-state conditions with regard to VOC contamination levels in the groundwater rather than overall decreases. There is some concern that the plume may be expanding in the vicinity of monitoring wells MW01-07 and MW03-11. Additional monitoring is needed to determine if there is any plume expansion occurring and to determine whether expeditious progress toward groundwater cleanup is occurring.

The ROD states that contingency measures such as additional source removal activities, groundwater extraction and treatment, and institutional controls may replace the selected remedy

if the remedy fails to show expeditious progress towards meeting specified remediation levels.

Additionally, the IMMP states that a contingency evaluation could be triggered if groundwater COC concentrations exceeding cleanup levels exhibit an increasing trend, show a statistically significant increase, or are above background levels in monitoring wells located beyond the original extent of impact. Therefore, based on the statistical results produced by Volpe and presented in this report, a contingency evaluation is required. According to the IMMP, the contingency evaluation will consist of an evaluation of the following:

- Monitoring frequency and parameters;
- Installation of additional monitoring wells;
- Technologies for groundwater collection and/or extraction;
- Technologies for groundwater containment;
- Additional source removal/control measures;
- Additional institutional controls; and
- Submission of a technical impracticability petition to obtain ARARs waivers.

Review of surface water and sediment sampling results are inconclusive to indicate whether cleanup goals will be achieved expeditiously. No elevated contaminant detections have been measured consistently at any of the surface water sampling locations. From the small number of results evaluated, sediment contamination does not appear to be Site-related. More sampling is needed before EPA can determine with certainty whether surface water and sediment cleanup goals are being achieved expeditiously.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid.

Changes in Standards and To be Considereds (TBC)

A list of the primary applicable or relevant and appropriate requirements (ARARs) and TBCs are included in Table 4. There have been no changes in these ARARs and TBCs that affect the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included current exposures and potential future exposures among the following receptor populations: adult worker at the Site; older child, teen visitor, or trespasser to the Site; and child visitor to the Site.

There have been no changes in the toxicity factors for the contaminants of concern that were used

in the baseline risk assessment that would affect the protectiveness of the remedy. EPA considers the assumptions in the baseline risk assessment to be conservative and reasonable in evaluating risk-based cleanup levels. No change to these assumptions or to the cleanup levels developed from them is warranted. There has been no change in the standardized risk assessment methodology that could affect the protectiveness of the remedy. The remedy is progressing as expected.

The fact that the Site owner moved a mobile home trailer near the capped area does not expose a resident to an unacceptable risk related to inhalation, ingestion, or dermal contact pathways; however, the location of the trailer may interfere with O&M activities and may present an unsafe situation for residents or visitors when O&M activities are occurring.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other events have affected the protectiveness of the remedy, and there is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

Based on a review of relevant documents, data, ARARs, risk assumptions, and the results of the Site inspection, it appears to EPA that the remedy is generally functioning as intended by the ROD. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. No changes to these assumptions are warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. The remedy is generally progressing as expected; however, more groundwater, surface water, and sediment sampling results are needed for evaluation before EPA can determine with certainty that the cleanup goals in the ROD are being achieved expeditiously. There is no other information available that calls into question the protectiveness of the remedy.

VIII. ISSUES

Table 5: Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Evidence of small animal burrows at a few locations on the cap	N	Y
LURA to Create an Equitable Servitude not agreed upon by the land owner and not filed with the Washington County Recorder's Office	N	Y
Erosion causing sedimentation into Tributary A	Y	Y
Site owner, on occasion, interferes with O&M activities	Y	Y
Mobile home trailer located within O&M area	N	N
Flowmeter used to measure the amount of water coming from under the capped area is not functional	N	Y
Access roads are eroding	N	N
Drainage pipes are occasionally clogged, preventing water drainage from the Site	N	Y
Collar of well MW03-12 is cracked	N	N
Expeditious progress toward meeting cleanup goals not shown	N	Y
Groundwater contingency evaluation has been triggered based on criteria listed in the April 2001 IMMP	Y	Y

IX. Recommendations and Follow-Up Actions

Table 6: Recommendations and Follow-up Actions

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Cur-rent	Future
Animal burrows in cap	Repair current burrows; continue to ensure future burrows are identified and repaired	PRPs	EPA/ Ohio EPA	Ongoing	N	Y
Unsigned, unrecorded land use restriction agreement	Continue to work with the Site owner to obtain a signed, recorded document	PRPs and EPA	EPA/ Ohio EPA	6/30/04	N	Y
Sedimenta-tion into Tributary A	Continue to implement controls such as rock placement, revegetation, and diversion measures	PRPs	EPA/ Ohio EPA	Ongoing	Y	Y
Site owner interferes with O&M activities	Continue to work with PRPs and Site owner; enforce against Site owner as necessary	PRPs and EPA	EPA/ Ohio EPA	6/30/04	Y	Y
Mobile home trailer in O&M area	Move trailer away from O&M area (to SW corner of Site, for example)	Site Owner	EPA/ Ohio EPA	6/30/04	N	N
Inoperative flowmeter	Repair and activate flowmeter	PRPs	EPA/ Ohio EPA	5/31/04	N	Y

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Cur-rent	Future
Eroding access roads	Continue to control erosion by adding rock, etc.	PRPs	EPA/Ohio EPA	Ongoing	N	N
Clogged drainage pipe	Periodically inspect and unclog drainage pipes	PRPs	EPA/Ohio EPA	Ongoing	N	Y
Cracked well collar (MW03-12)	Repair crack or replace collar	PRPs	EPA/Ohio EPA	5/31/04	N	N
Expeditious progress toward meeting cleanup goals not shown	Continue collection and analysis of samples	PRPs	EPA/Ohio EPA	Ongoing	N	Y
Groundwater contingency evaluation has been triggered based on criteria listed in the April 2001 IMMP	Conduct the evaluation	PRPs	EPA/Ohio EPA	08/16/04	Y	Y

X. Protectiveness Statement

EPA expects the remedy to be fully protective of human health and the environment upon attainment of groundwater, surface water, and sediment cleanup goals. In the interim, exposure pathways that could result in unacceptable risks are being controlled, and institutional controls are preventing exposure to, or the ingestion of, contaminated groundwater. Threats at the Site have been addressed through consolidation and capping of contaminated soil, installation of fencing and warning signs, and implementation of institutional controls.

Long-term protectiveness of the remedial action will be verified by continuing the groundwater, surface, and sediment sampling to fully evaluate migration of contaminants from the capped area.

Long-term protectiveness of the remedial action is unknown, since expeditious progress toward meeting cleanup goals has not yet been established. Conducting the groundwater contingency evaluation described in this report and continuing the groundwater, surface, and sediment sampling to fully evaluate migration and attenuation of contaminants from the capped area will help to determine long-term protectiveness.

XI. Next Review

The next Five-Year Review for the Vandale Junkyard Superfund Site is required by April 2009, five years from the date of this review.

TABLES

Table 2: List of Documents Reviewed

Construction Completion Report, Vandale Junkyard Superfund Site, GeoSyntec Consultants, August 2000

Final Remedial Investigation Report, Vandale Junkyard Superfund Site, Metcalf & Eddy, Inc. for the U.S. Environmental Protection Agency; February 18, 1992

Groundwater, Surface Water, and Sediment Sampling and Analysis Reports, GeoSyntec Consultants, September 2001 to November 2003

Inspection, Maintenance, and Monitoring Plan, Vandale Junkyard Superfund Site, GeoSyntec Consultants, April 2001

Land Use Restriction Agreement to Create an Equitable Servitude (draft), Vandale Junkyard Superfund Site, U.S. EPA Region 5, undated

Monitored Natural Attenuation Efficacy Evaluation Report, Vandale Junkyard Superfund Site, GeoSyntec Consultants, December 2003

Record of Decision, Vandale Junkyard Superfund Site, U.S. EPA Region 5; March 31, 1994

Superfund Preliminary Close-Out Report, Vandale Junkyard Superfund Site, U.S. EPA Region 5; July 7, 2000

Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, OSWER Directive 9200.4-17P; April 21, 1999

Vandale Junkyard - OHD980794606 Statistical Analysis Report, Abridged Version (Significant Results Only), Volpe National Transportation Systems Center for U.S. EPA, January 2004

Table 3: Results of Statistically Significant Contaminants of Concern (COCs)

Contaminant and Wells	UCL (Comparison to Std.) (µg/l)	Cleanup Standard (µg/l)	Exceeds Standard	Trend	Worse or Better? (Natural Attenuation)
1,1-dichloroethene		1.5			
MW01-07	26.3		Yes		Sig. Better
MW01-08	138.6		Yes	Increasing	
MW01-10	64.4		Yes		
cis-1,2-dichloroethene		100			
MW01-07	198.3		Yes		Sig. Better
MW01-08	1224		Yes		
MW01-10	378		Yes		
tetrachloro-ethene		1.5			
MW01-02	2.8		Yes		
MW01-07	4.2		Yes	Decreasing	Sig. Better
MW01-08	4.5		Yes		
MW01-10	17.7		Yes		
trans-1,2-dichloroethene		100			
MW01-07	1.1		No	Decreasing	
vinyl chloride		0.5			
MW01-07	14.8		Yes		
MW01-08	59.4		Yes	Decreasing	
MW01-10	7.8		Yes		
antimony		5			
MW01-10	8		Yes		
barium		302			
MW01-08	430		Yes		
bis (2-ethylhexyl) phthalate		1.0			
MW01-07	2.6		Yes		
MW01-08	4.9		Yes		
MW01 -10	3.6		Yes		

Table 3 Explanation of Results Columns

"Exceeds Standard" column: "Yes" means the upper confidence limit (UCL) for the contaminant concentration of the most recent four samples exceeded the cleanup standard. These well locations are considered contaminated.

"Trend" or "Sen's test" column: "Increasing" signifies that the contaminant concentration within a well is increasing over time. Attention should be given to wells with increasing trends, since this could signify migration of the contaminant, non-containment of the contaminant source, or other possible problems with the remediation process. "Decreasing" signifies that the contamination within a well is decreasing over time. A decreasing trend signifies that the contamination at the particular well location is degrading.

"Worse or Better?/Natural Attenuation" column: "Significantly Worse" means that the contaminant concentration of the most recent sample exceeds the baseline upper prediction limit (UPL) for that well location. This signifies that the contaminant concentration of the most recent sample statistically exceeds previous sample concentrations within the well and is evidence that the contamination is becoming worse at the well location. "Significantly Better" means that the contaminant concentration of the most recent sample was below the baseline lower prediction limit (LPL) for that well location. This signifies that the concentration of the most recent sample was statistically below previous concentrations of the well and is evidence that the contamination is significantly better at the well location.

Table 4: List of Primary ARARs and TBCs

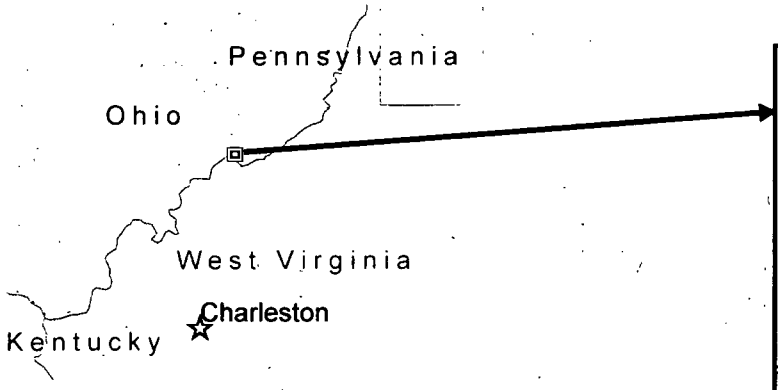
Description of Federal ARAR	Reference
groundwater maximum contaminant levels	Safe Drinking Water Act
surface water quality standards	Clean Water Act
	U.S. EPA Ambient Water Quality Criteria
standards for owners and operators of hazardous waste treatment, storage, and disposal facilities	40 CFR Part 264
Resource Conservation and Recovery Act (RCRA) Land Disposal Restrictions	40 CFR Part 268
standards for airborne releases	Clean Air Act
procedures for planning and implementing off-site response actions	40 CFR Part 300.440
Description of State ARAR	
management of hazardous wastes	Ohio Administrative Code (OAC) 3745-54
closure and post-closure requirements	OAC 3745-55
hazardous wastes restricted from land disposal	OAC 3745-59
primary drinking water rules	OAC 3745-81
air pollution control requirements	OAC 3745-15, 17, and 21
recyclable material standards	OAC 3745-58
water quality standards	OAC 3745-1
Description of TBCs	
classification of groundwater aquifers	U.S. EPA Groundwater Classification Guidelines
development of health based cleanup goals	U.S. EPA Integrated Risk Information System (IRIS)

FIGURES

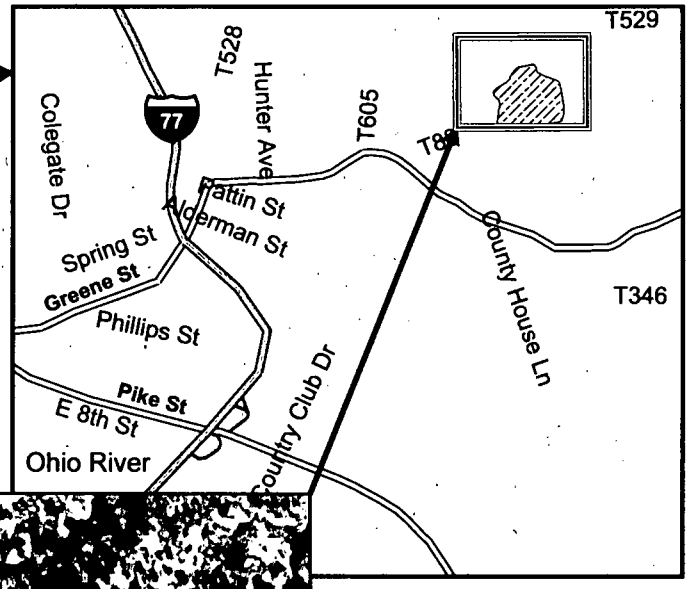
Figure 1

Van Dale Junkyard Superfund Site
Washington County, Ohio

1) State



2) City of Marietta



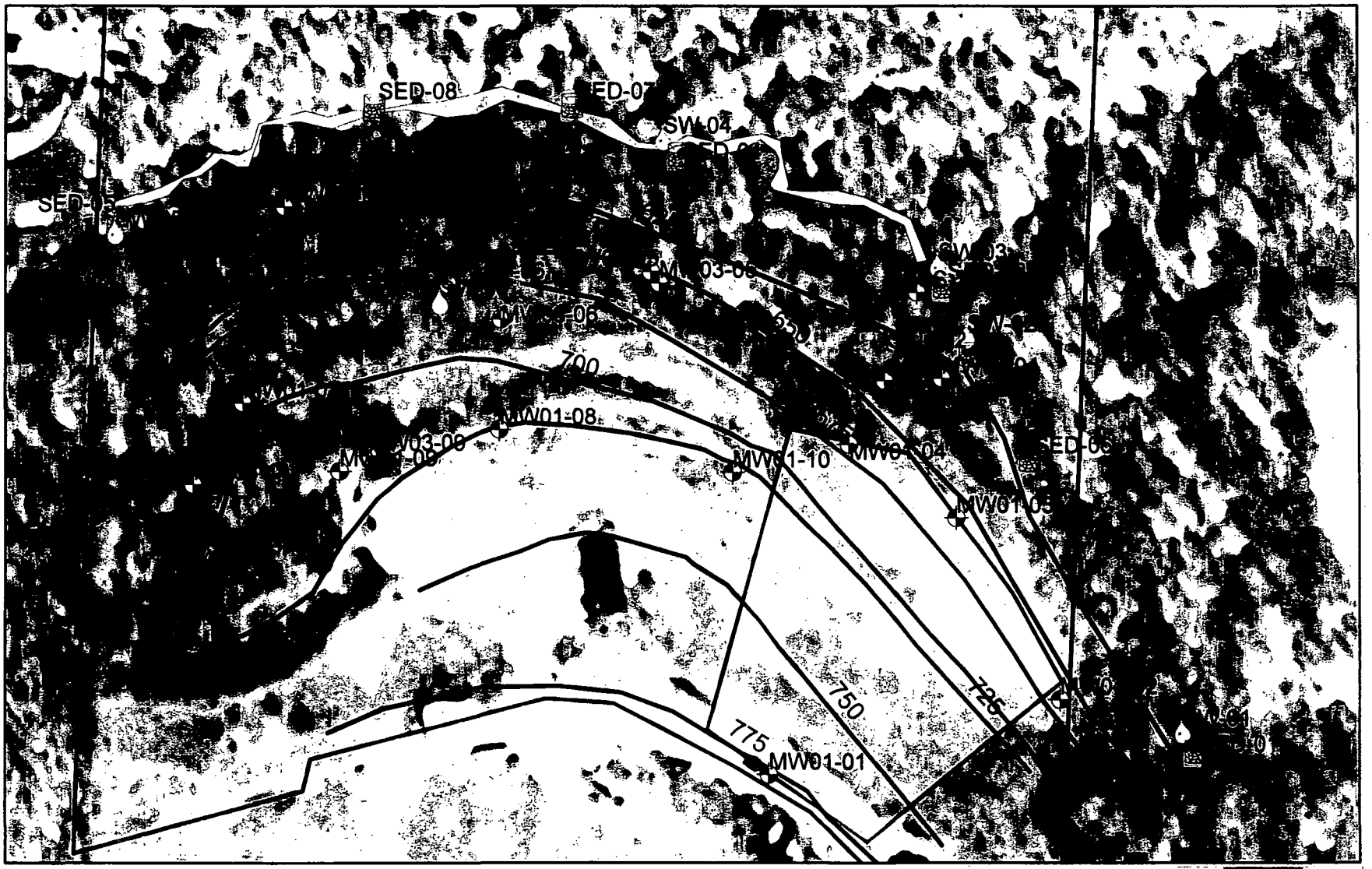
3) Van Dale Junkyard Superfund Site

GEOS
Groundwater Evaluation and Optimization System

Plot created by David Wilson U.S. EPA Regon 1/28/2004
Image Date: 4/5/1998

Figure 2

Van Dale Junkyard Superfund Site
Water Level Elevations Fourth Quarter 2003



Sampling Locations

- MW - Monitoring Well
- SED - Sediment
- SW - Surface Water

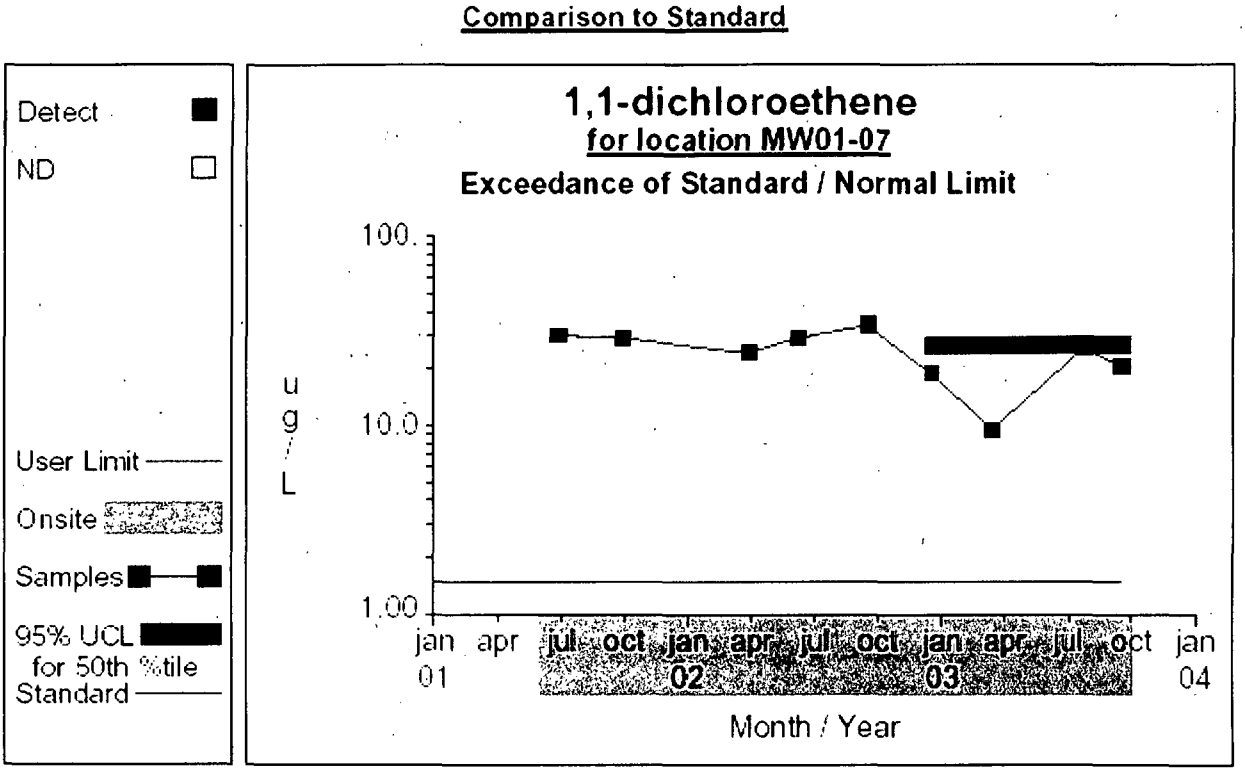
N

175 87.5 0 175 Feet

GEOS
Groundwater Evaluation and Optimization System

Created By: David Wilson 2/26/2004
B&W Image Date: 05 /04/1997

Figure 3


Comparison to Standard
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for location MW01-07
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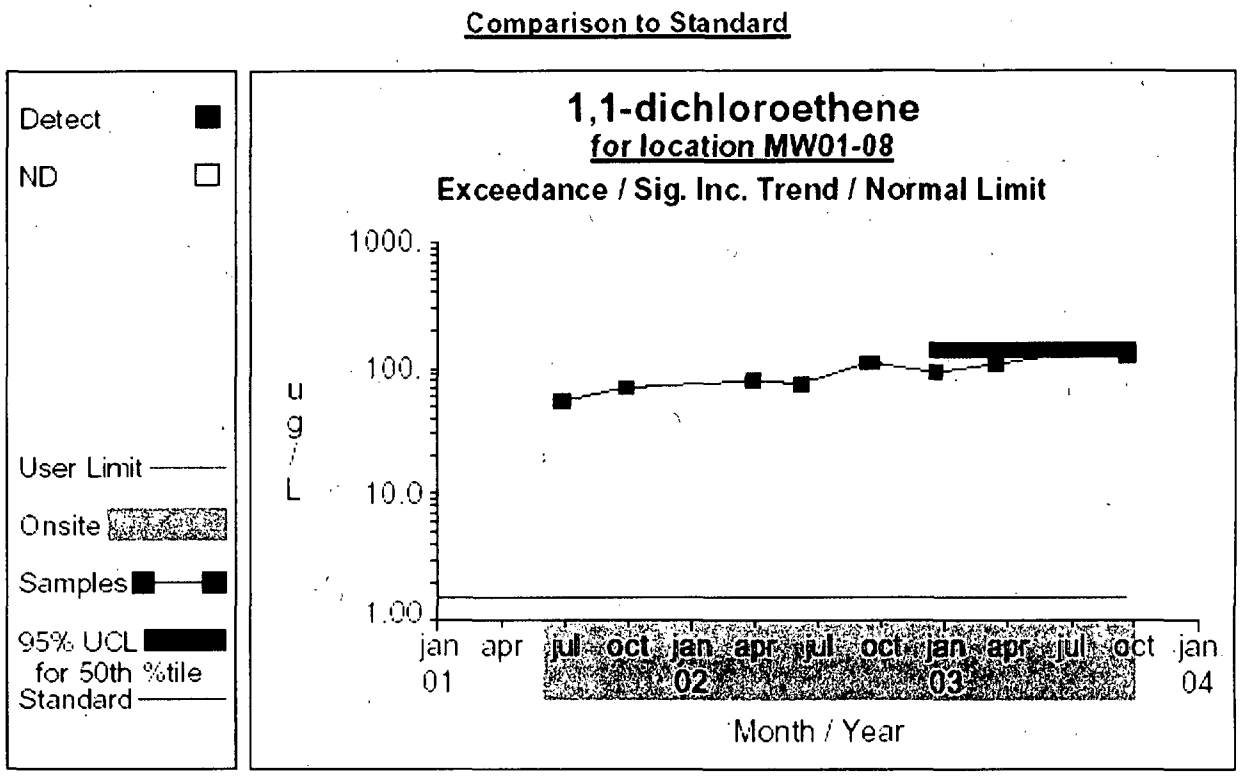
Figure 4


Comparison to Standard
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for location MW01-08
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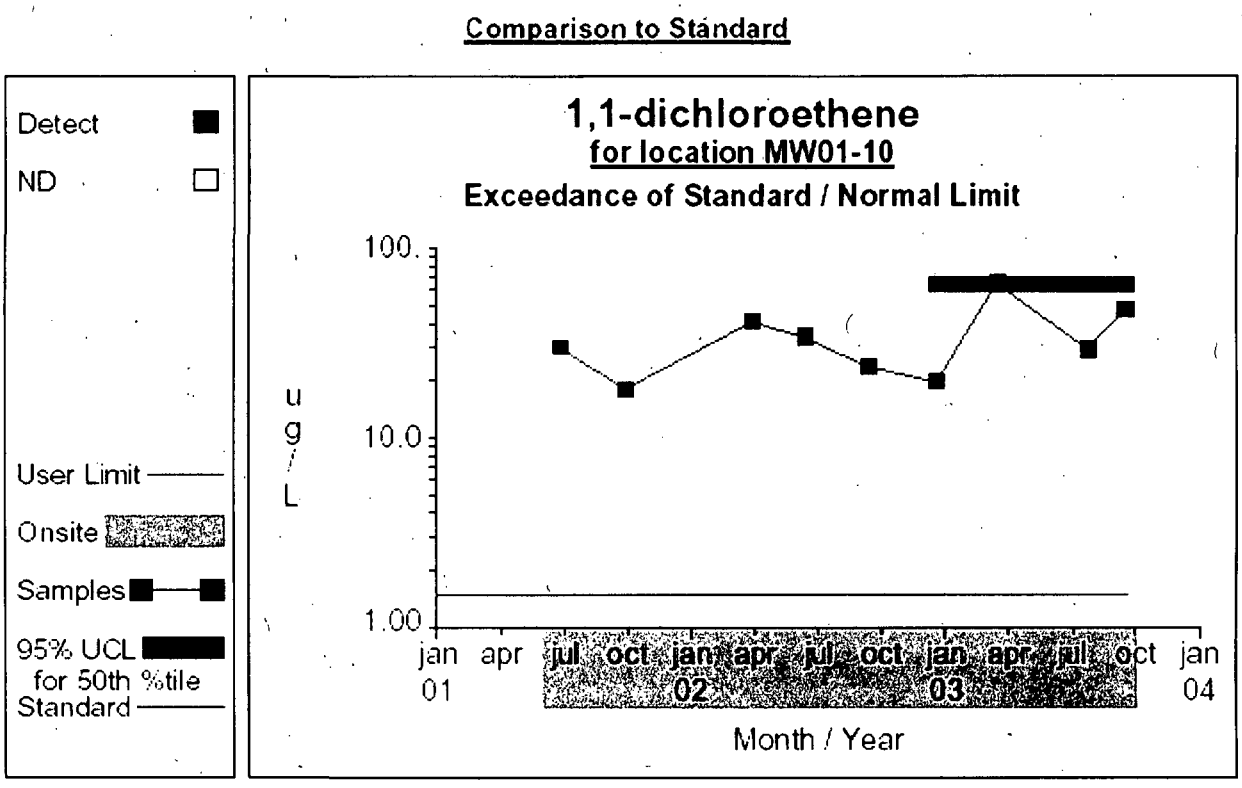
Figure 5


Comparison to Standard
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for location MW01-10
Exceedance of Standard / Normal Limit
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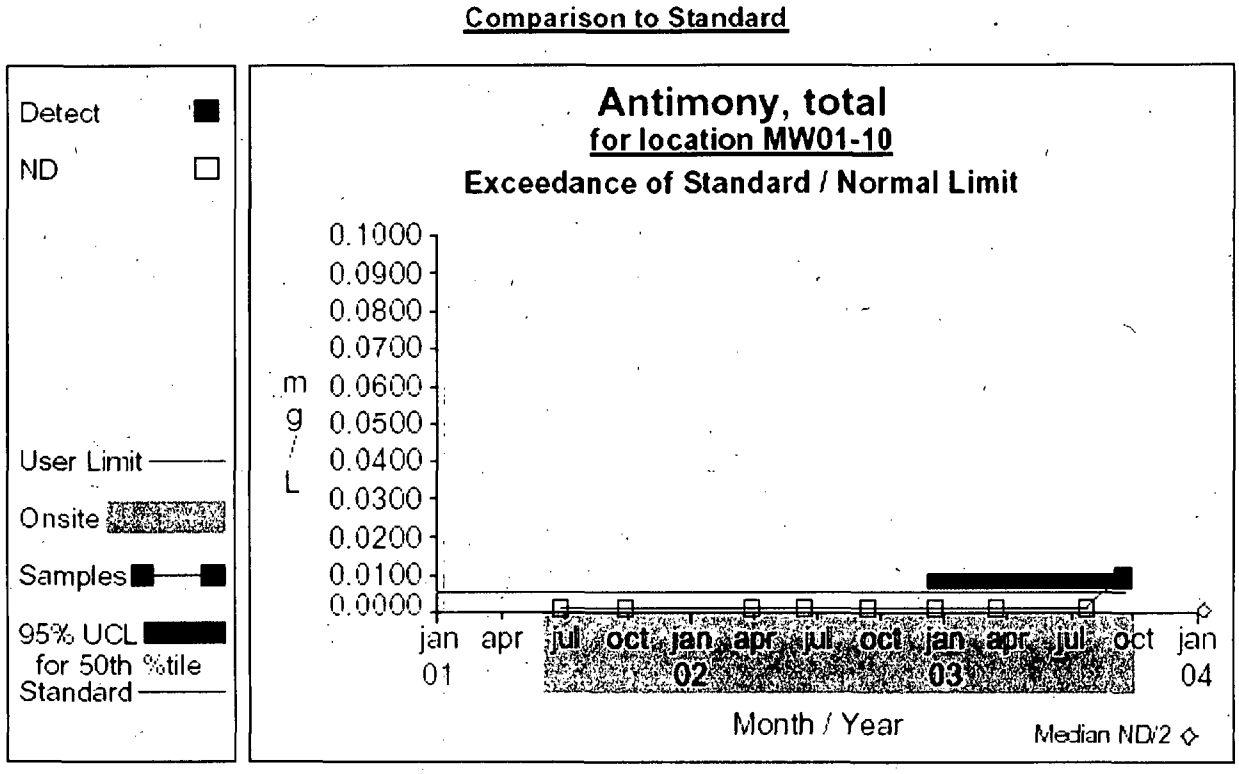
Figure 6


Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
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Standard
Antimony, total
for location MW01-10
Exceedance of Standard / Normal Limit
mg/L
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0.0800
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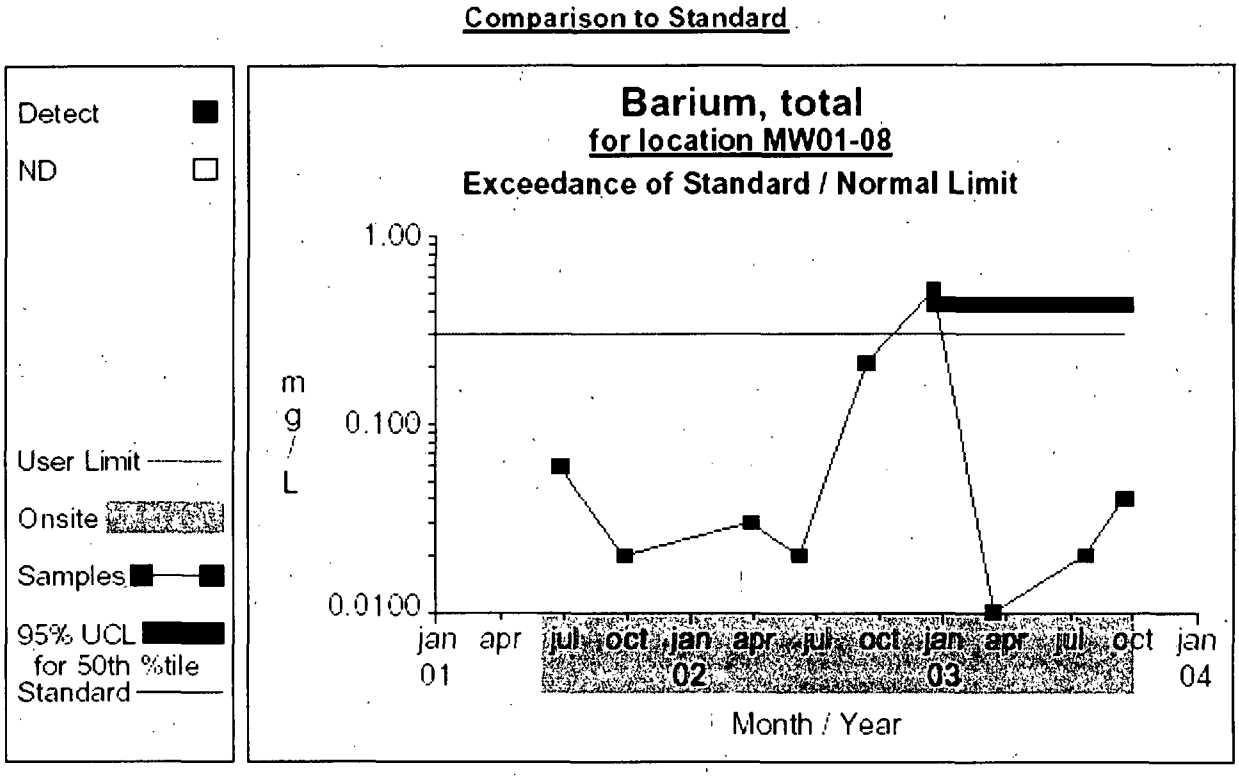
Figure 7


Comparison to Standard
Detect
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User Limit
Onsite
Samples
95% UCL for 50th %tile
Standard
Barium, total
for location MW01-08
Exceedance of Standard / Normal Limit
1.00
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Month / Year

Figure 8

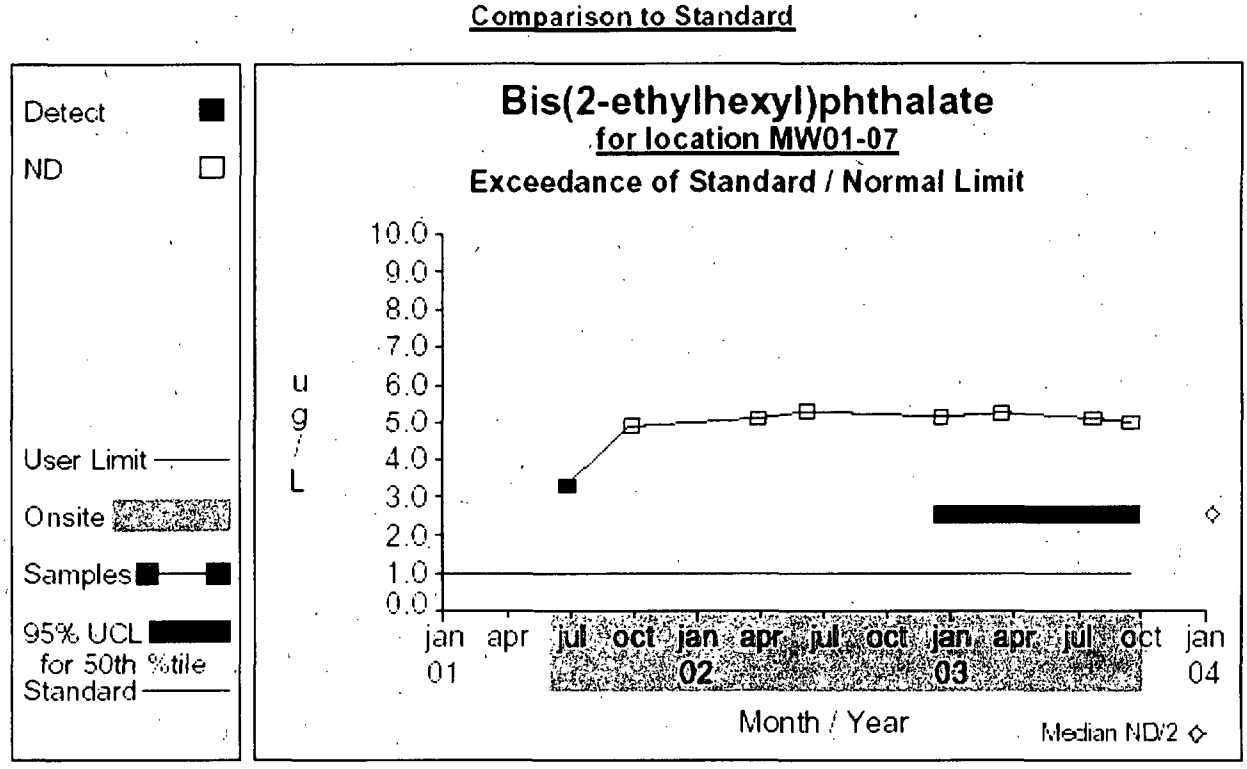

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL for 50th %tile
Standard
Bis(2-ethylhexyl)phthalate
for location MW01-07
Exceedance of Standard / Normal Limit
u g / L
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year
Median ND/2

Figure 9

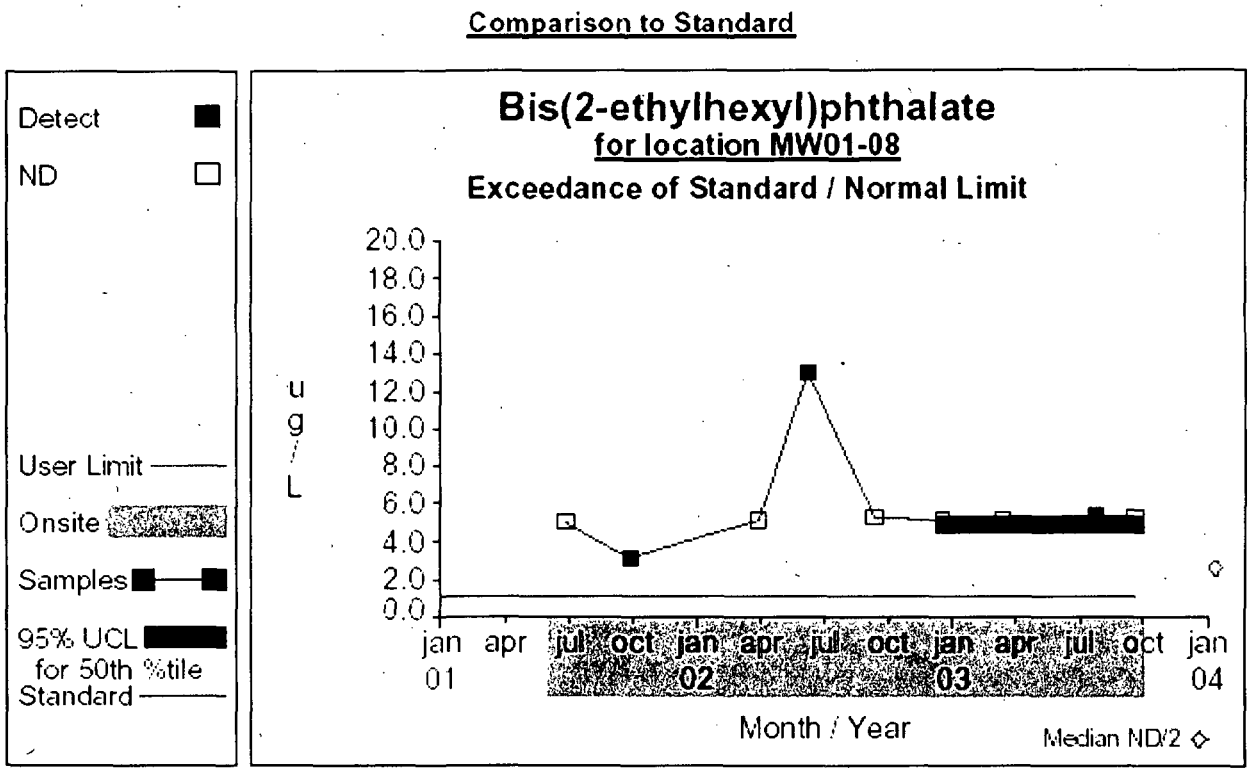

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL for 50th %tile
Standard
Bis(2-ethylhexyl)phthalate
for location MW01-08
Exceedance of Standard / Normal Limit
u g / L
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year
Median ND/2

Figure 10

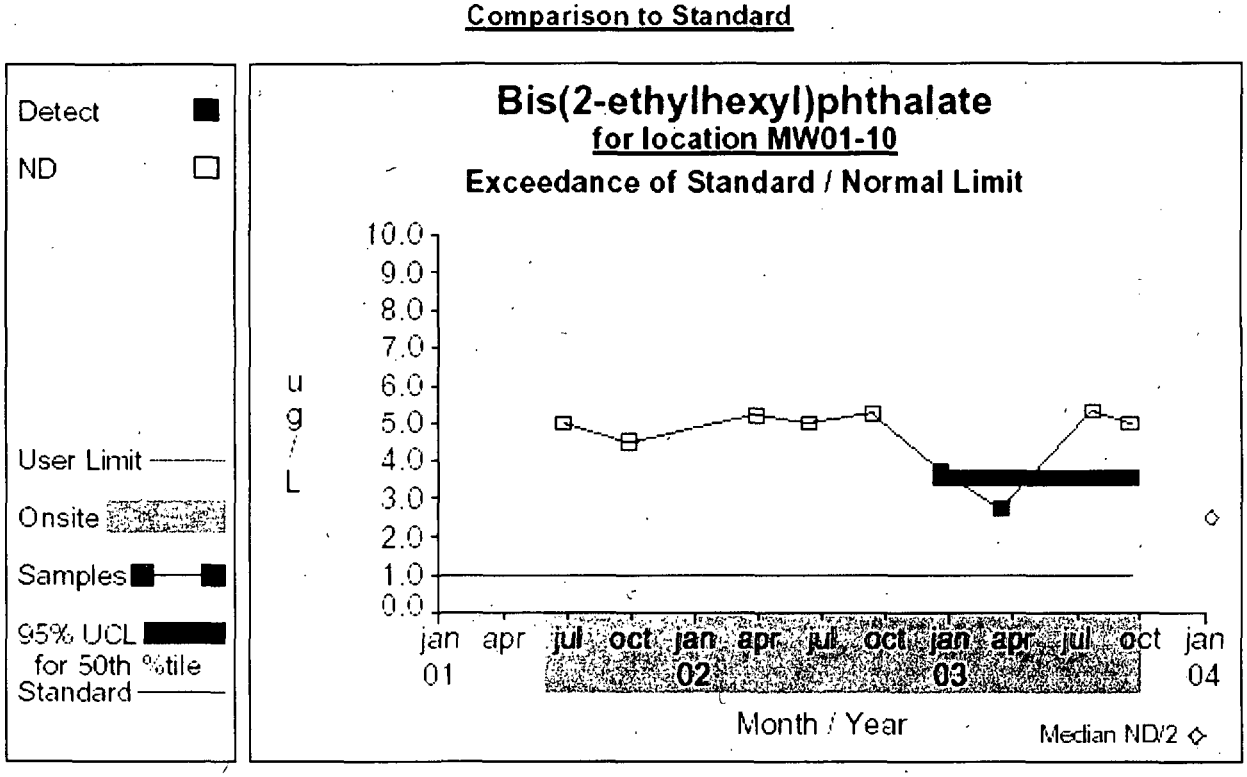

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL for 50th %tile
Standard
Bis(2-ethylhexyl)phthalate
for location MW01-10
Exceedance of Standard / Normal Limit
u g / L
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
jan apr jul oct jan apr jul oct jan apr jul oct jan
01 02 03 04
Month / Year
Median ND/2

Figure 11

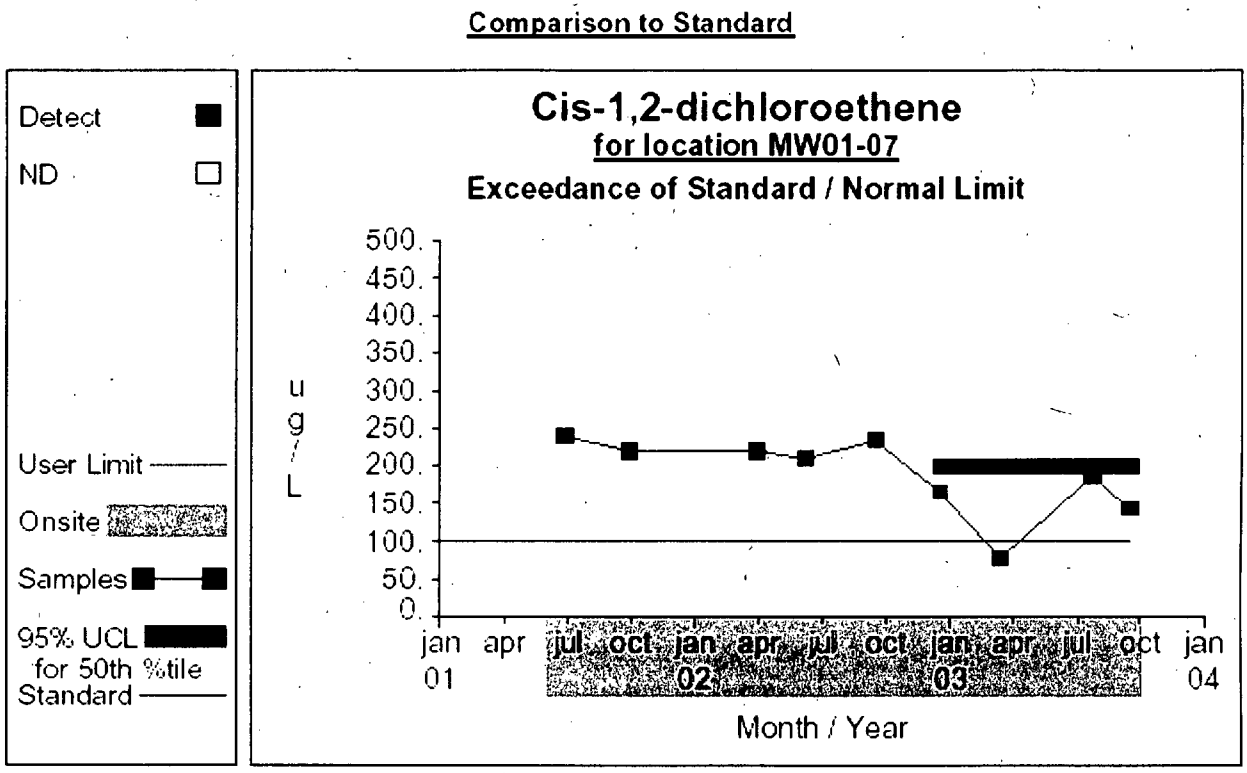

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL
for 50th %tile
Standard
Cis-1,2-dichloroethene
for location MW01-07
Exceedance of Standard / Normal Limit
u
g
/
L
500.
450.
400.
350.
300.
250.
200.
150.
100.
50.
0.
jan
01
apr
jul
oct
jan
02
apr
jul
oct
jan
03
apr
jul
oct
jan
04
Month / Year

Figure 12

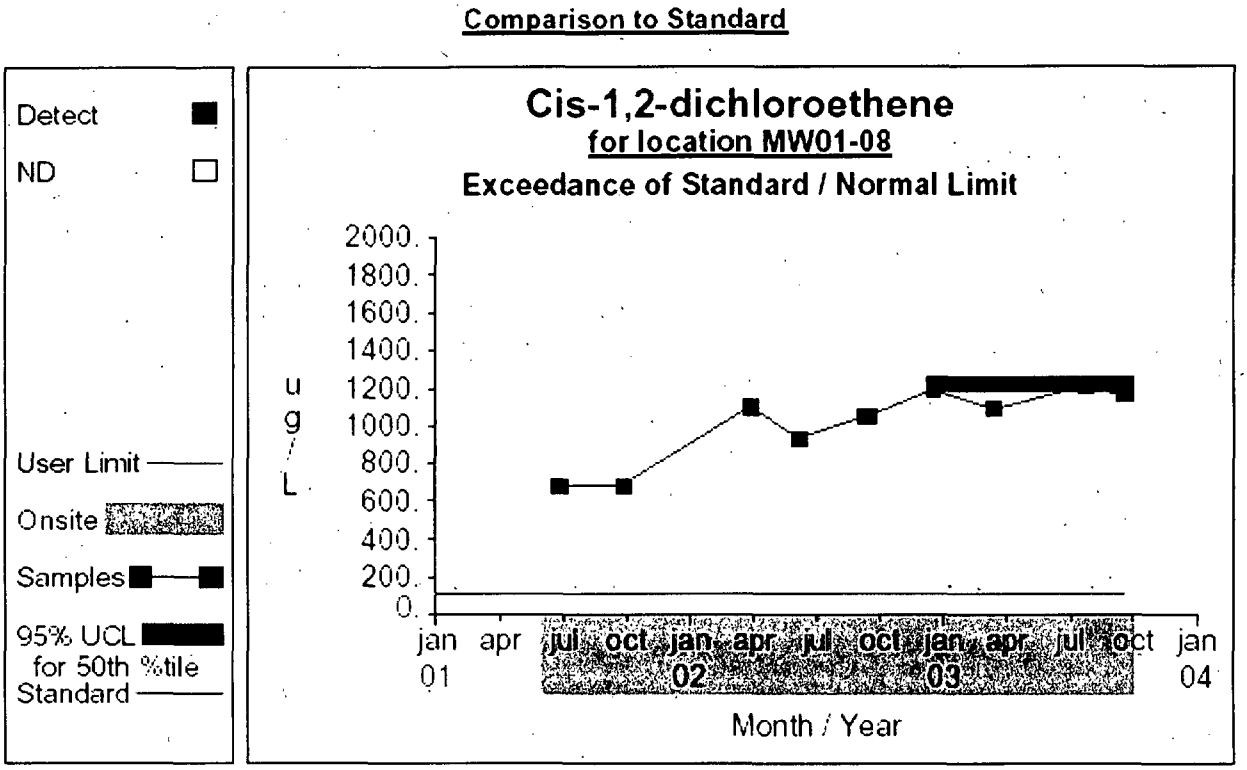

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL for 50th %tile
Standard
Cis-1,2-dichloroethene
for location MW01-08
Exceedance of Standard / Normal Limit
u g / L
2000.
1800.
1600.
1400.
1200.
1000.
800.
600.
400.
200.
0.
jan 01
apr
jul
oct
jan
apr
jul
oct
jan
apr
jul
oct
jan 04
02
03
Month / Year

Figure 13

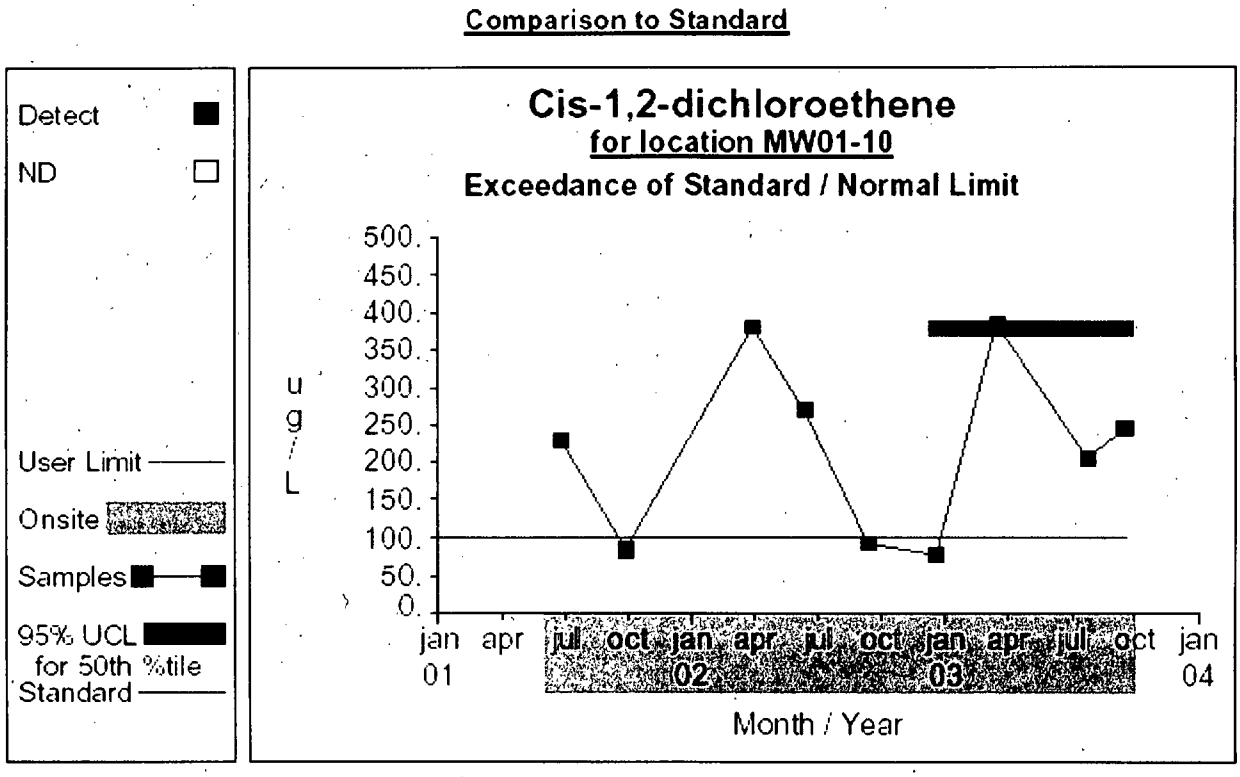

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL
for 50th %tile
Standard
Cis-1,2-dichloroethene
for location MW01-10
Exceedance of Standard / Normal Limit
u
g
/
L
500.
450.
400.
350.
300.
250.
200.
150.
100.
50.
0.
jan
01
apr
jul
oct
jan
02
apr
jul
oct
jan
03
apr
jul
oct
jan
04
Month / Year

Figure 14

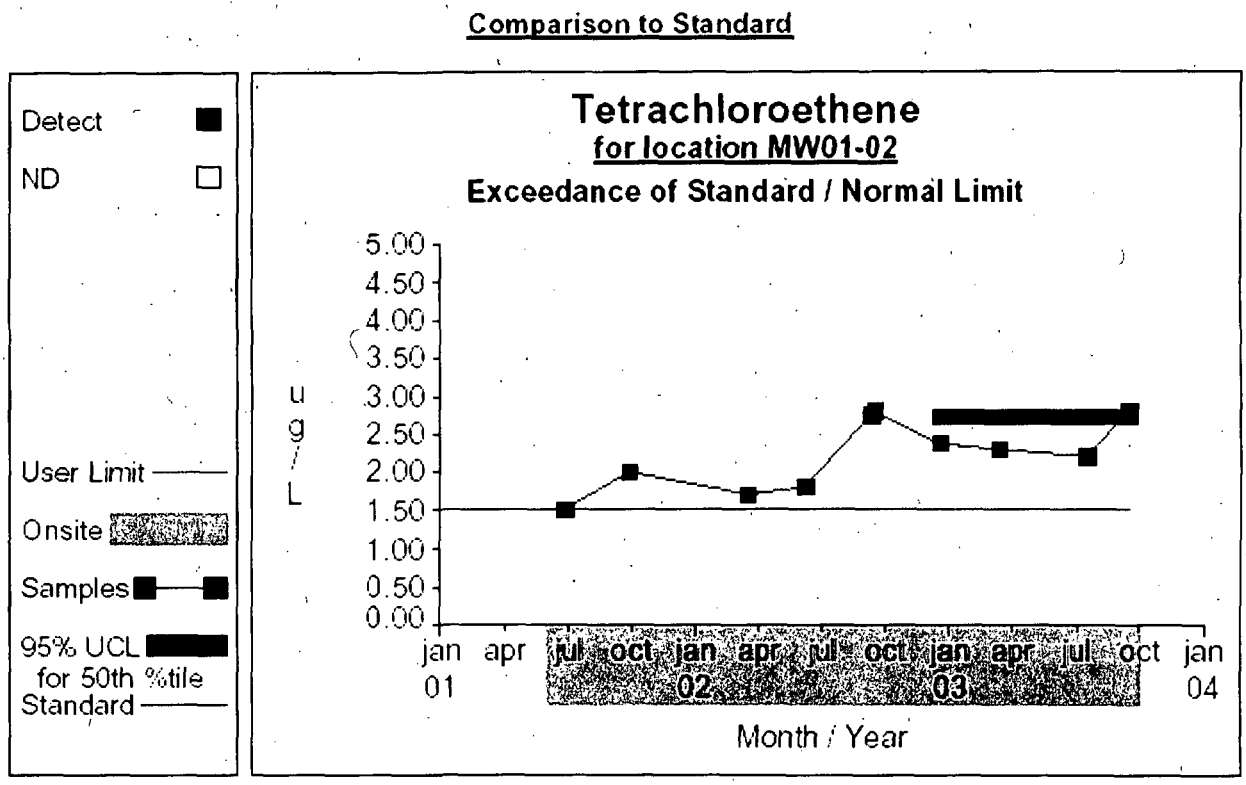

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL for 50th %tile
Standard
Tetrachloroethene
for location MW01-02
Exceedance of Standard / Normal Limit
u g / L
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year

Figure 15

Comparison to Standard

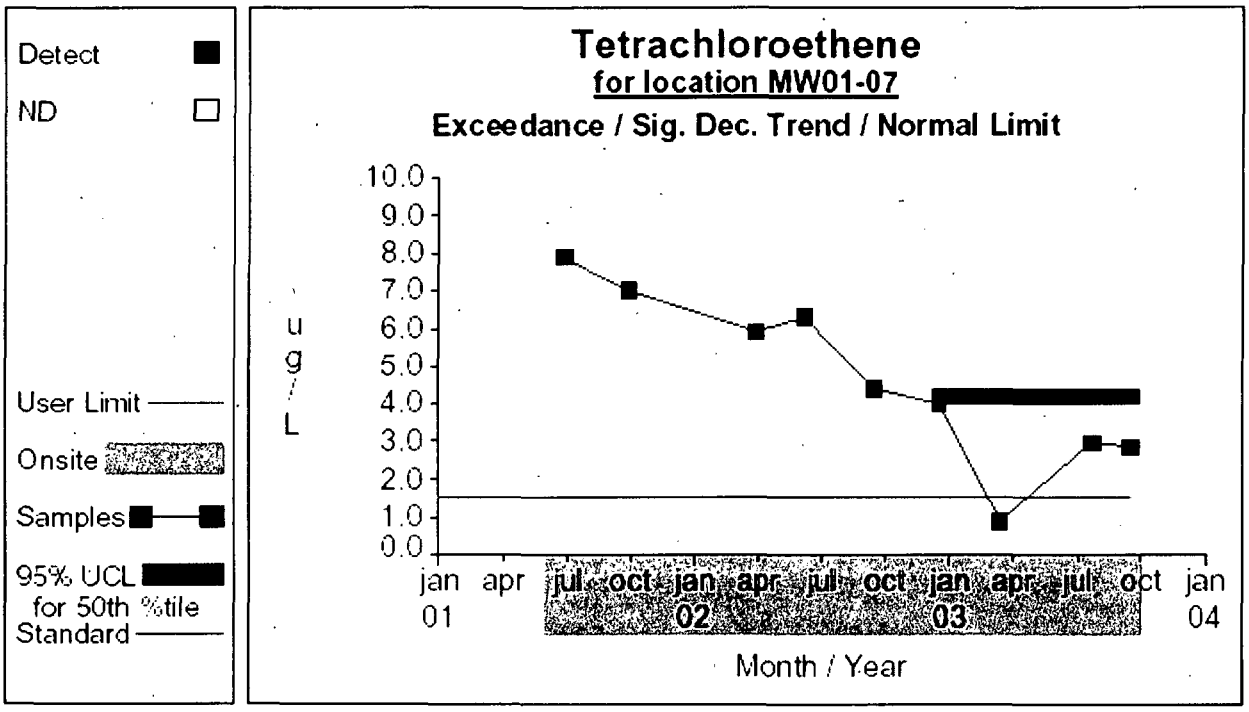


Figure 16

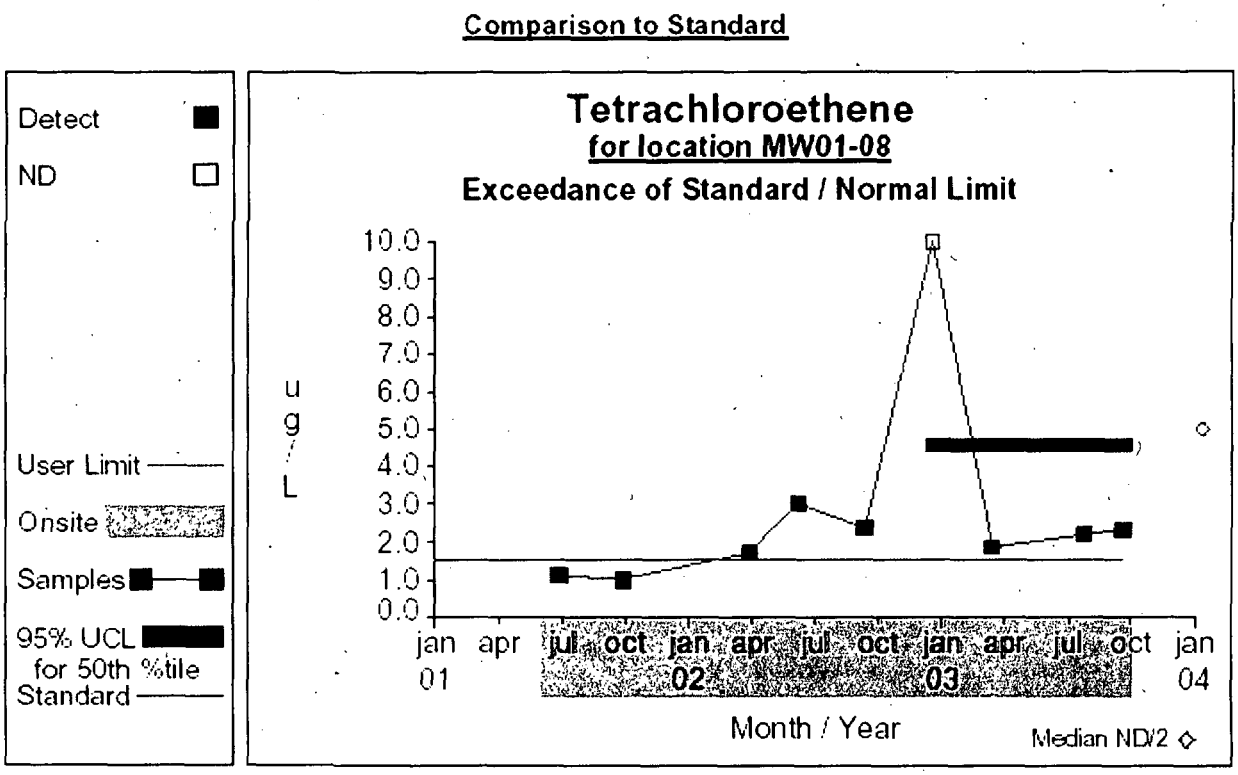

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL
for 50th %tile
Standard
Tetrachloroethene
for location MW01-08
Exceedance of Standard / Normal Limit
u
g
/
L
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year
Median ND/2

Figure 17

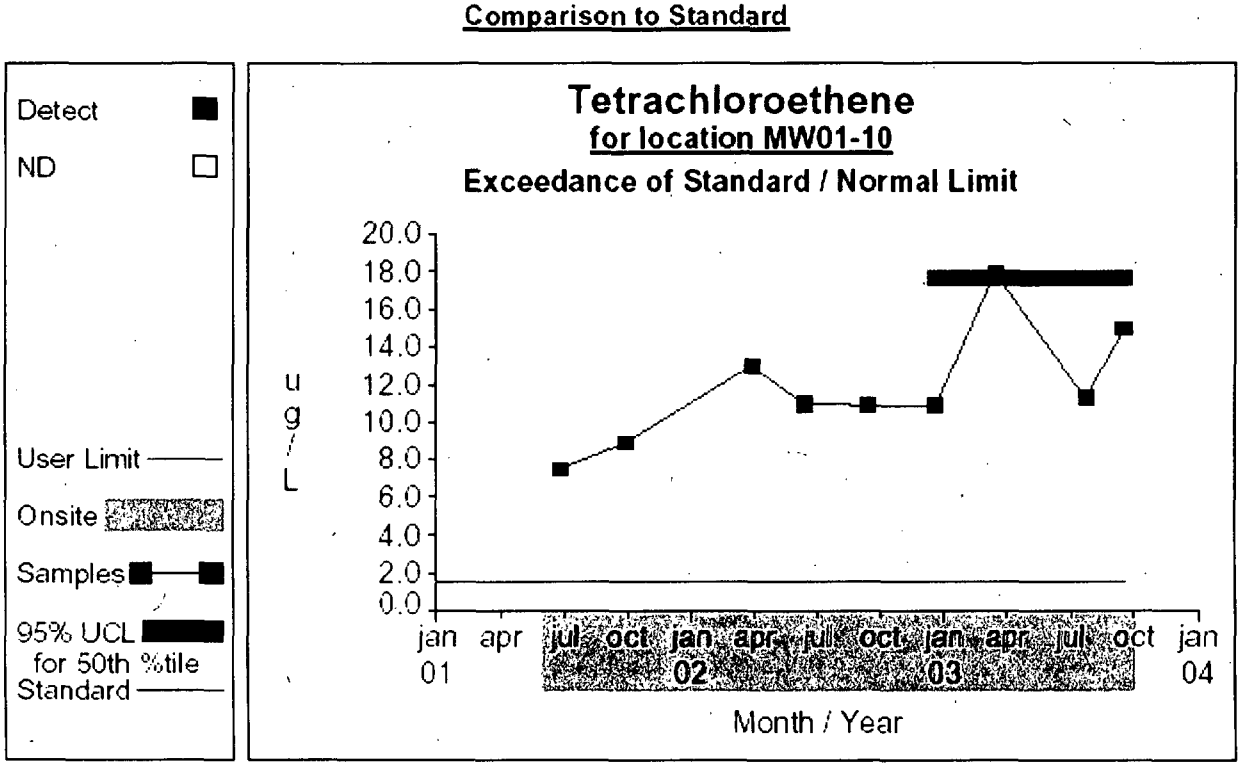

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL
for 50th %tile
Standard
Tetrachloroethene
for location MW01-10
Exceedance of Standard / Normal Limit
u
g
/
L
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
jan
01
apr
jul
oct
jan
02
apr
jul
oct
jan
03
apr
jul
oct
jan
04
Month / Year

Figure 18

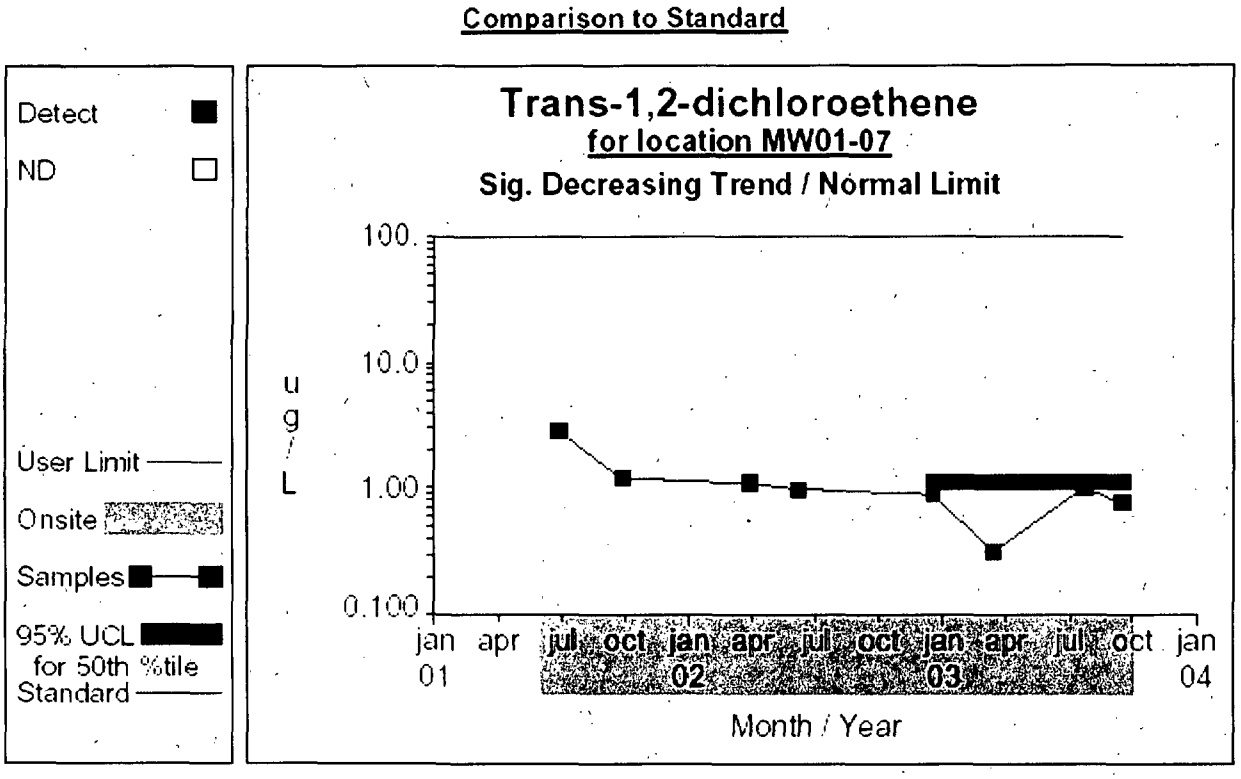

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL for 50th %tile
Standard
Trans-1,2-dichloroethene
for location MW01-07
Sig. Decreasing Trend / Normal Limit
100.
10.0
1.00
0.100
u g / L
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year

Figure 19

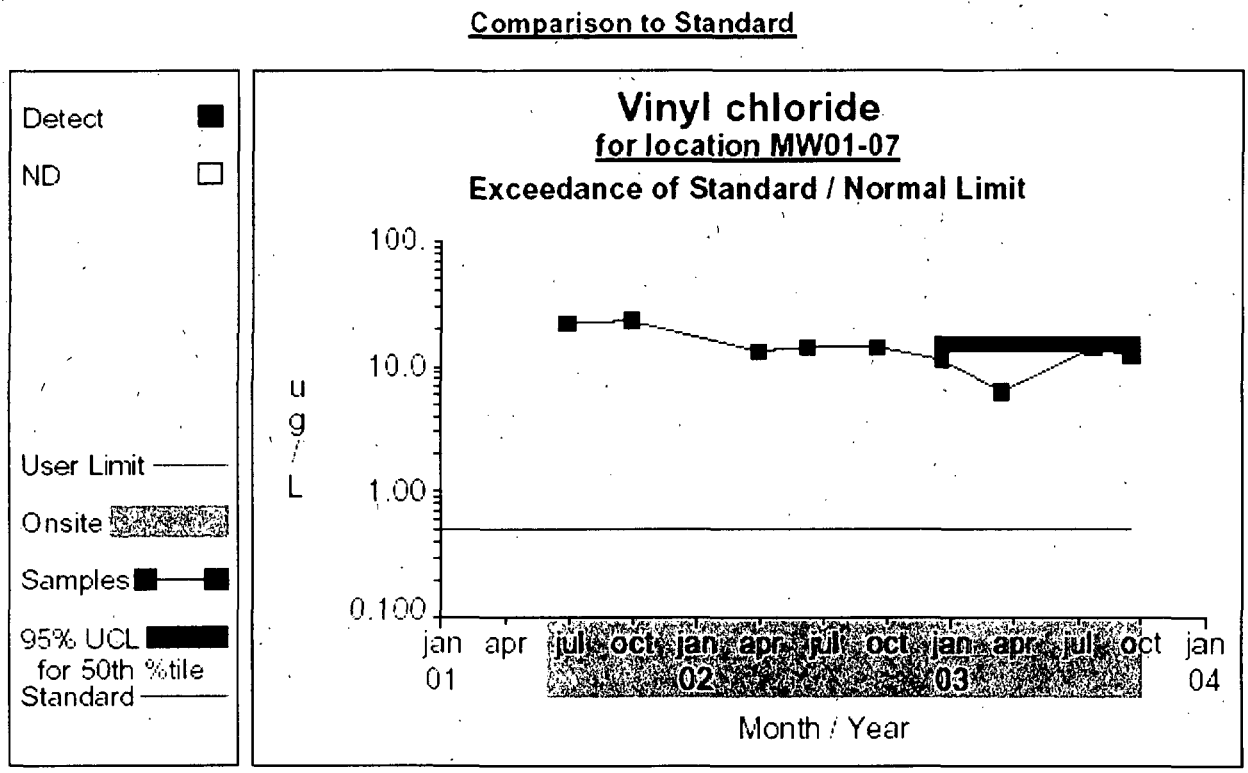

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL for 50th %tile
Standard
Vinyl chloride
for location MW01-07
Exceedance of Standard / Normal Limit
100.
10.0
1.00
0.100
u g / L
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year

Figure 20

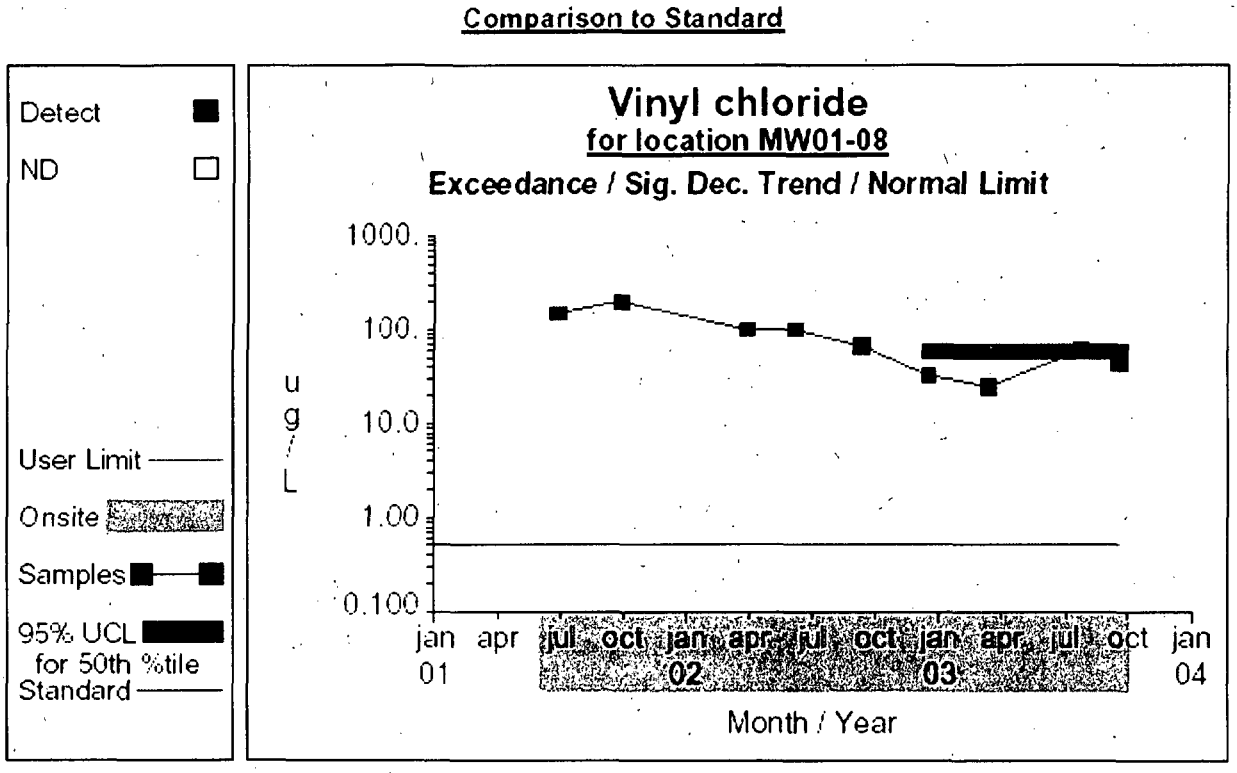

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL
for 50th %tile
Standard
Vinyl chloride
for location MW01-08
Exceedance / Sig. Dec. Trend / Normal Limit
1000.
100.
10.0
1.00
0.100
u
g
/
L
jan
01
apr
jul
oct
jan
02
apr
jul
oct
jan
03
apr
jul
oct
jan
04
Month / Year

Figure 21

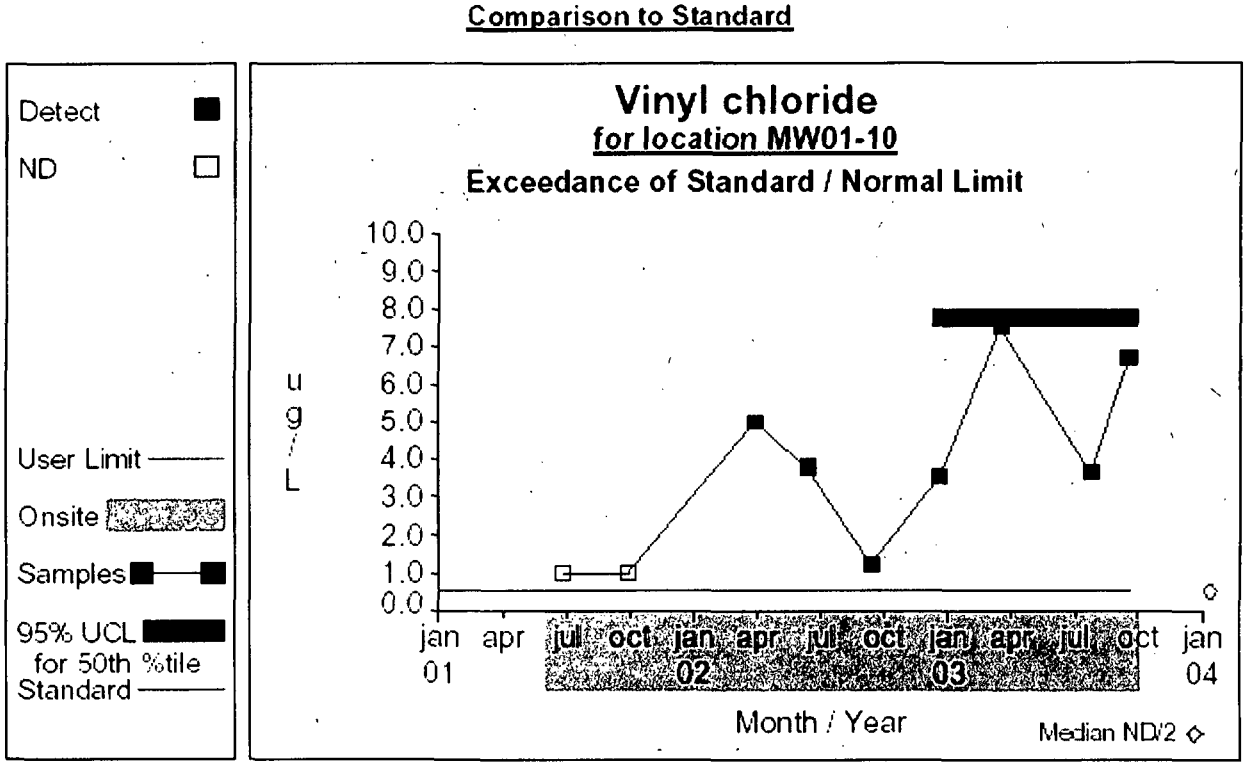

Comparison to Standard
Detect
ND
User Limit
Onsite
Samples
95% UCL for 50th %tile
Standard
Vinyl chloride
for location MW01-10
Exceedance of Standard / Normal Limit
u g / L
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year
Median ND/2

Figure 22

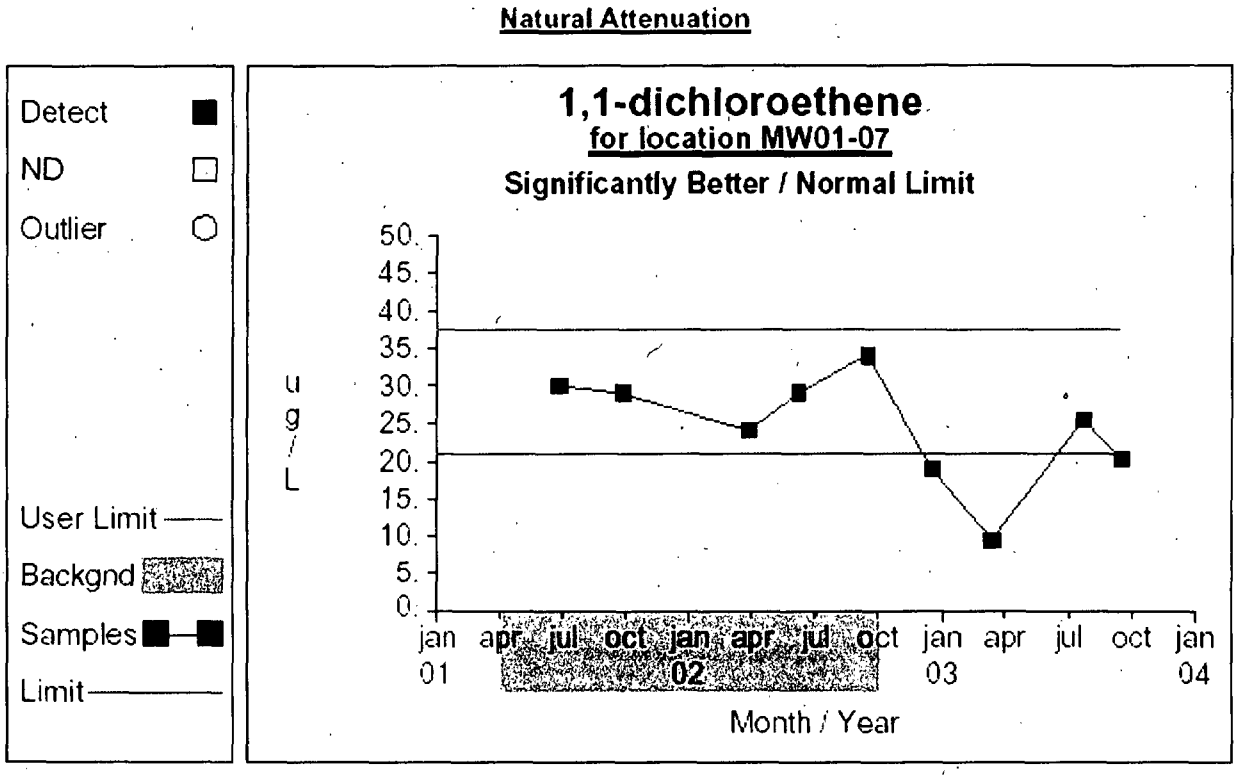

Natural Attenuation
Detect
ND
Outlier
User Limit
Backgnd
Samples
Limit
1,1-dichloroethene
for location MW01-07
Significantly Better / Normal Limit
ug/L
50.
45.
40.
35.
30.
25.
20.
15.
10.
5.
0.
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year

Figure 23

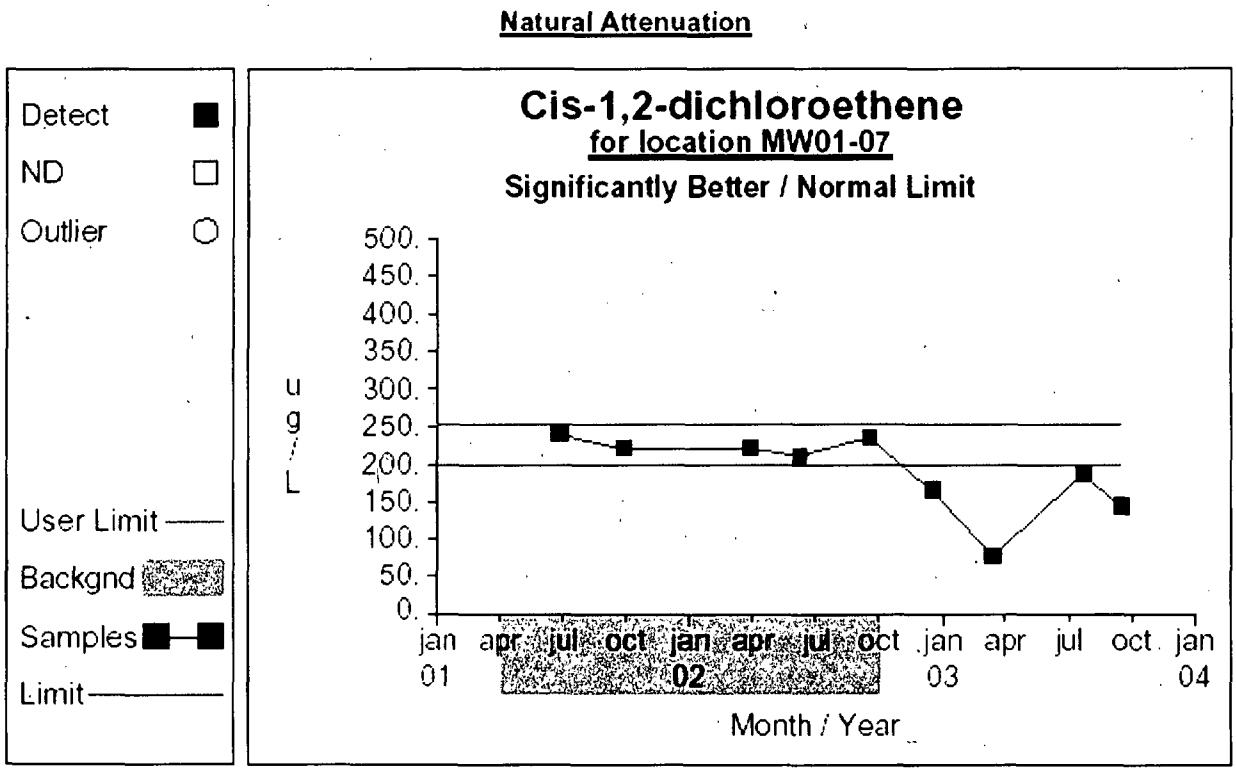

Natural Attenuation
Detect
ND
Outlier
User Limit
Backgnd
Samples
Limit
Cis-1,2-dichloroethene
for location MW01-07
Significantly Better / Normal Limit
ug/L
500.
450.
400.
350.
300.
250.
200.
150.
100.
50.
0.
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year

Figure 24

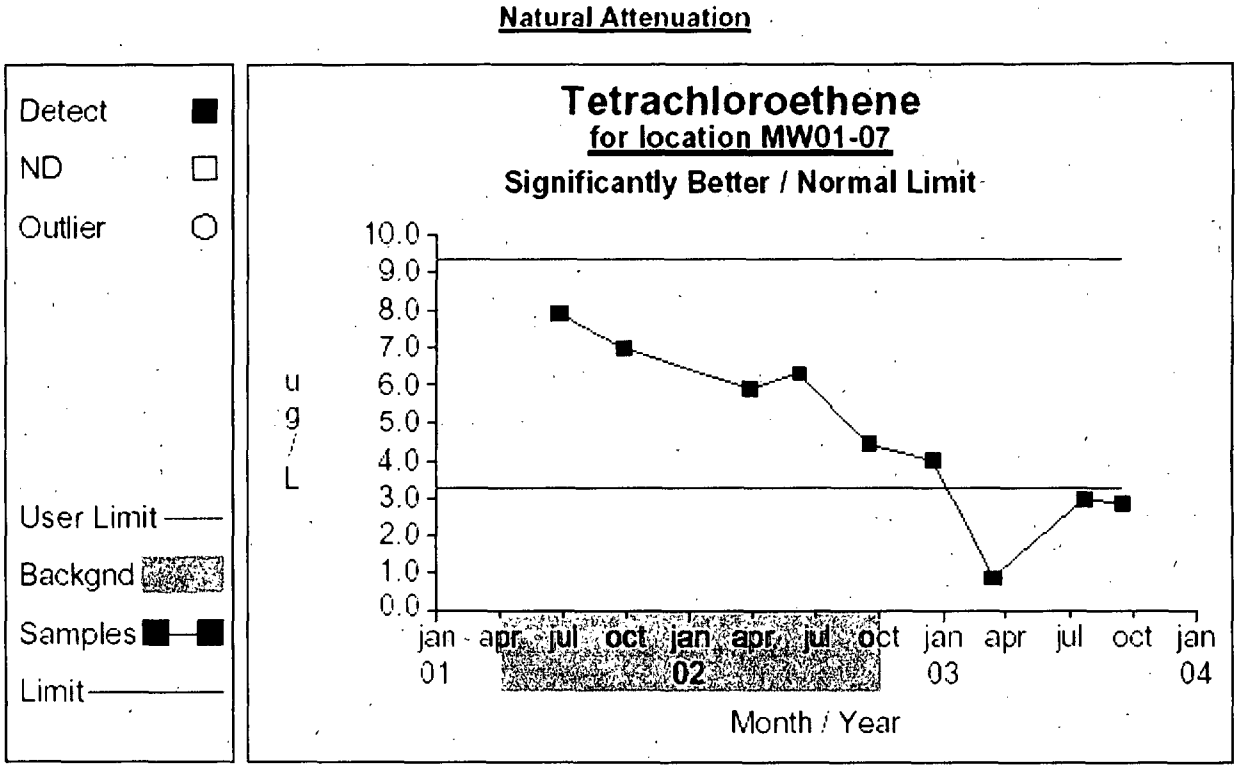

Natural Attenuation
Detect
ND
Outlier
User Limit
Backgnd
Samples
Limit
Tetrachloroethene
for location MW01-07
Significantly Better / Normal Limit
u
g
/
L
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year

Figure 25

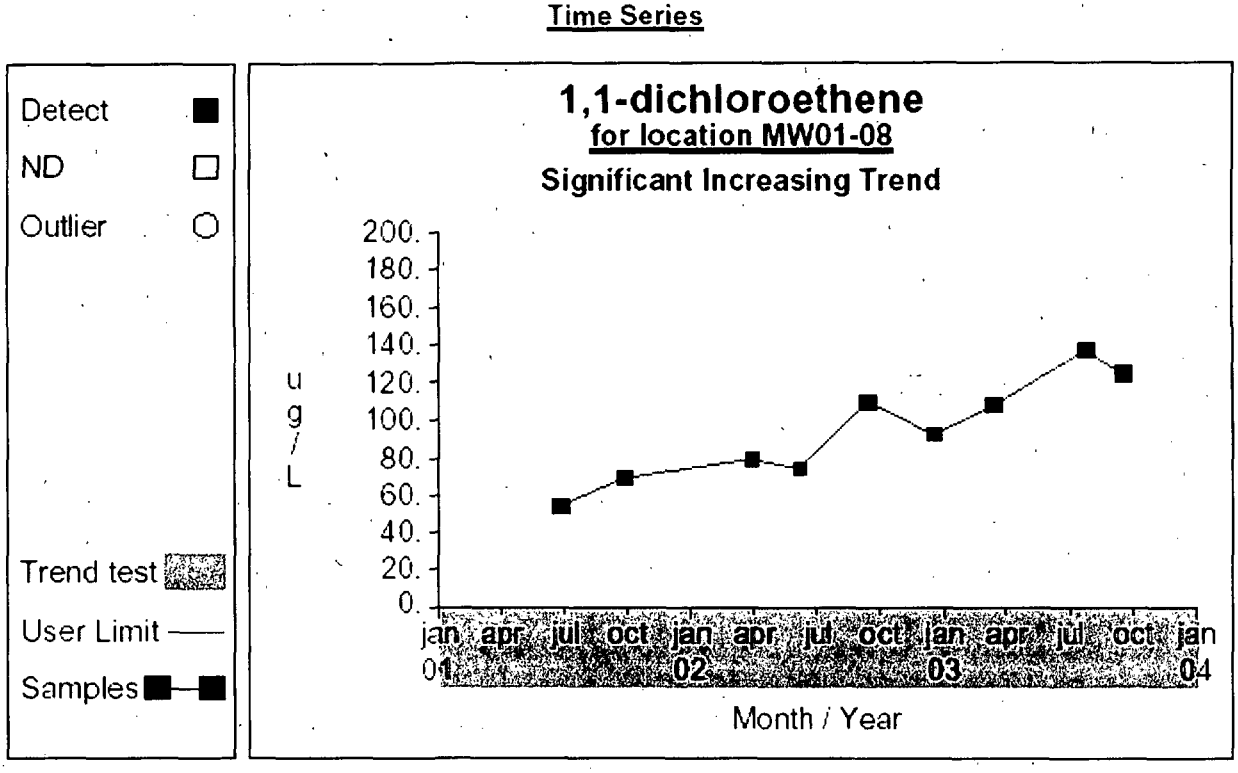

Time Series
Detect
ND
Outlier
Trend test
User Limit
Samples
1,1-dichloroethene
for location MW01-08
Significant Increasing Trend
u
g
/
L
200.
180.
160.
140.
120.
100.
80.
60.
40.
20.
0.
jan apr jul oct jan apr jul oct jan apr jul oct jan
01 02 03 04
Month / Year

Figure 26

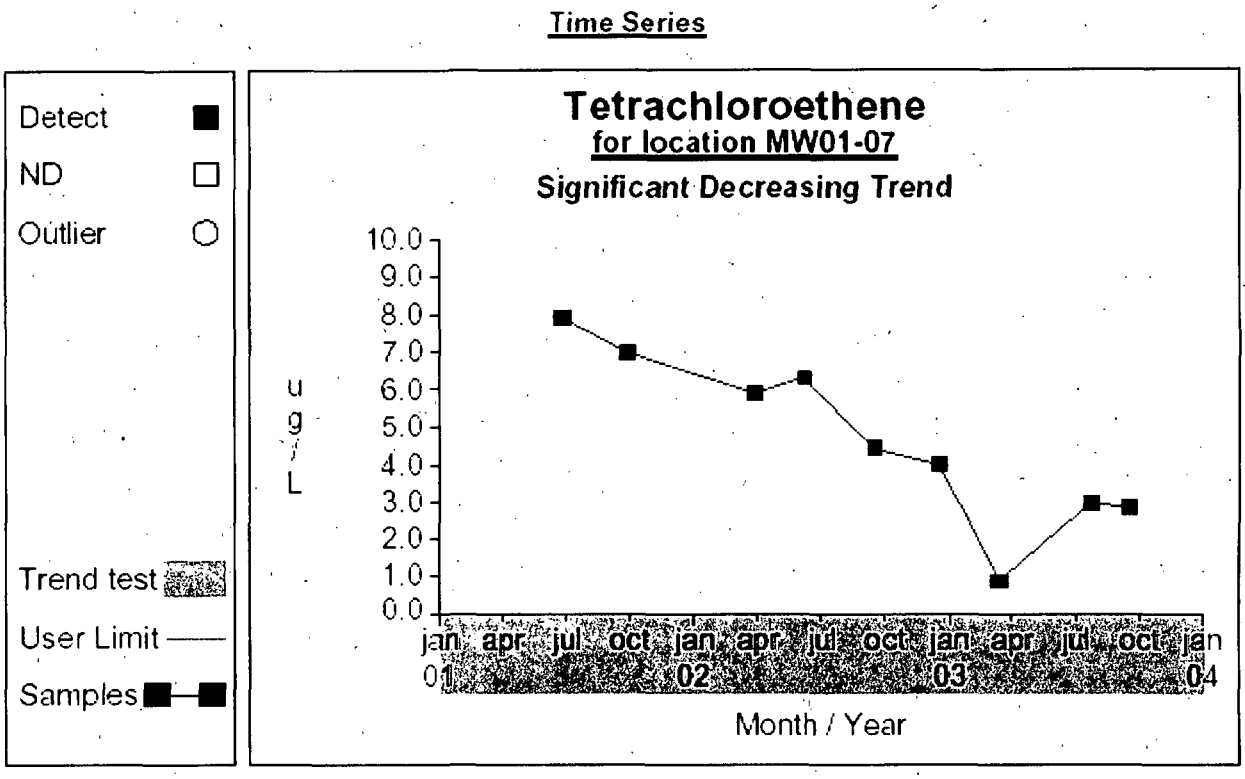

Time Series
Detect
ND
Outlier
Trend test
User Limit
Samples
Tetrachloroethene
for location MW01-07
Significant Decreasing Trend
u
g
/
L
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
jan apr jul oct jan apr jul oct jan apr jul oct jan
01 02 03 04
Month / Year

Figure 27

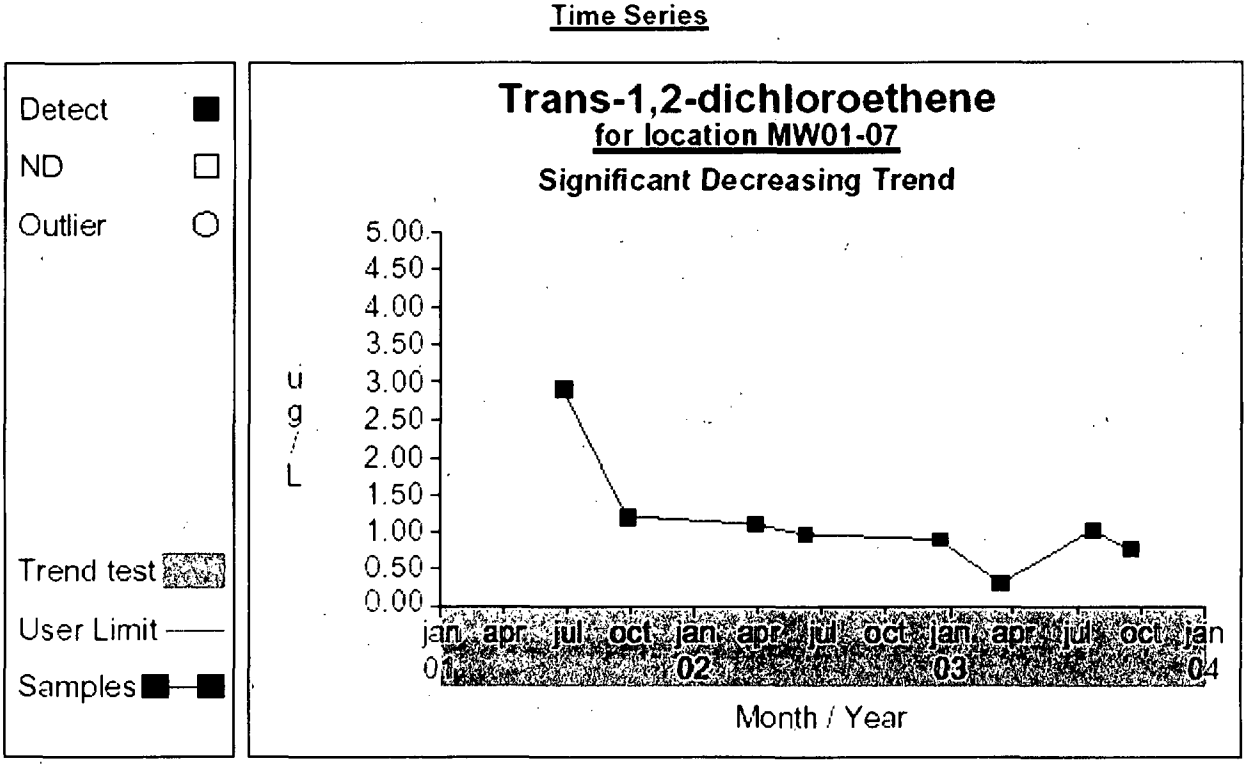
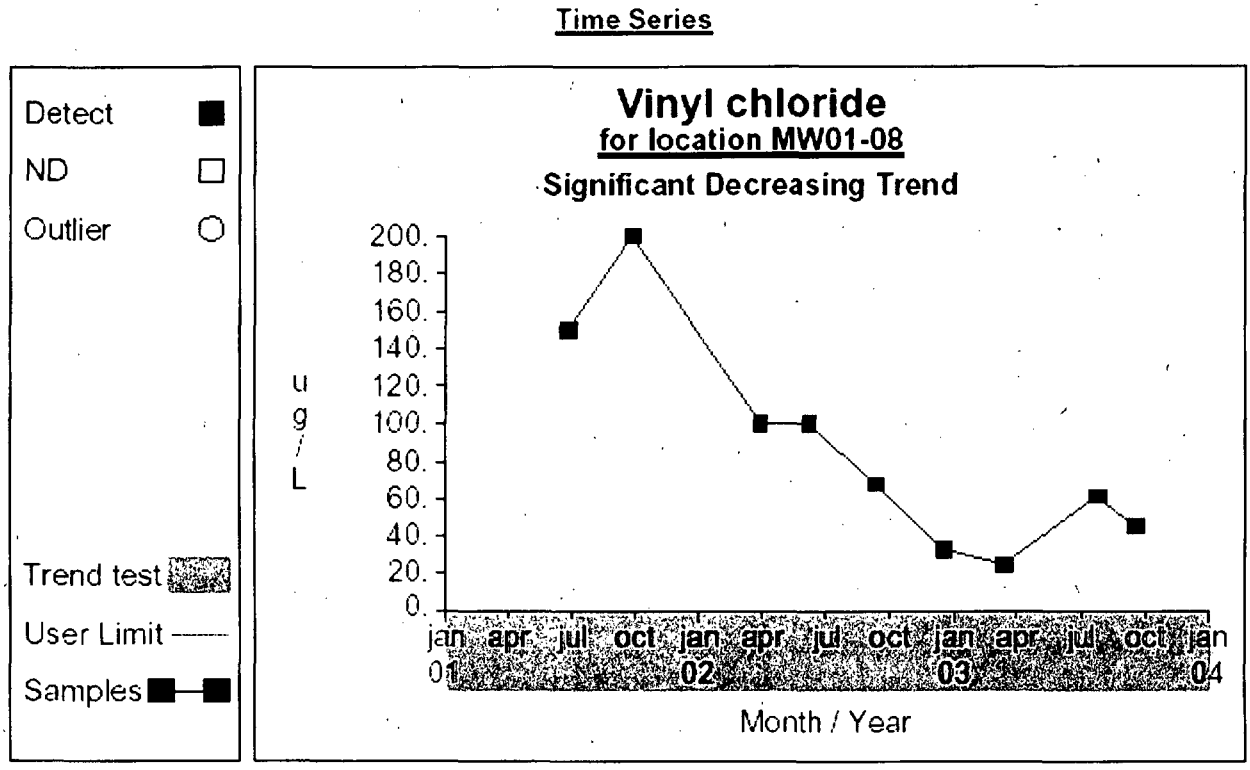

Time Series
Detect
ND
Outlier
Trend test
User Limit
Samples
Trans-1,2-dichloroethene
for location MW01-07
Significant Decreasing Trend
ug/L
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
jan apr jul oct jan apr jul oct jan apr jul oct jan
01 02 03 04
Month / Year

Figure 28


Time Series
Detect
ND
Outlier
Trend test
User Limit
Samples
Vinyl chloride
for location MW01-08
Significant Decreasing Trend
u
g
/
L
200.
180.
160.
140.
120.
100.
80.
60.
40.
20.
0.
jan 01
apr
jul
oct
jan 02
apr
jul
oct
jan 03
apr
jul
oct
jan 04
Month / Year